

DISEASES of the CHEST

VOLUME XI

JULY-AUGUST, 1945

NUMBER 4

INTRODUCTION

Symposium on Tuberculosis in Institutions*

OTTO C. SCHLACK, M.D., F.C.C.P.**
Oak Forest, Illinois

Institutions, large and small, offer a fertile field for the finding of open and healed tuberculosis. The term "institution" is applied to industries; schools; prisons; general, mental and other hospitals.

The symposium to be presented on this program tonight will deal with tuberculosis in institutions for the mentally ill, prisons, colleges and universities, and the Veterans Administration. Each speaker appearing on this program has had extensive experience in the institutions to be covered in the symposium.

Dr. Chester A. Stewart has made a number of valuable contributions in tuberculosis in children. His remarks are always timely and interesting. I am sure that you will find them so tonight.

Dr. Herbert A. Burns will tell us how the state of Minnesota is handling the tuberculosis problems in its institutions for the mentally ill. Dr. Otto L. Bettag will discuss tuberculosis in prisons and he will tell us of his experiences at the penal institution in Pontiac, Illinois. Dr. Ruth A. Boynton has done a great deal of work with the Student's Health Service and she will tell us of the progress made in finding tuberculosis in our colleges and universities.

Colonel Roy A. Wolford, the Governor of the College for the Veterans Administration, will talk to us on the care of the tuberculous veteran. Certainly, the veteran is entitled to the best medical care which can be obtained in the treatment of tuberculosis and steps should be taken to attract competent chest specialists to the Veterans Administration. These physicians should be placed in a position to practice their specialty unhampered by political or other outside interferences. Only through such an arrangement can the veteran be assured of the proper care in the treatment of tuberculosis. Colonel Wolford will tell us of what is being done in the Veterans Administration to care for our tuberculous veterans.

In all institutions there should be a chest physician employed on a full time basis or where this is not feasible, arrangements should be made for a chest consultant. Every employee and inmate of an institution, every student in a college or university, and every employee in an industry should have the benefit of x-ray examination. These examinations should be conducted by qualified chest physicians.

*Chairman, Symposium presented at the 10th Annual Meeting of the American College of Chest Physicians, Chicago, Illinois, June 10, 1944.

**Medical Director, Cook County Tuberculosis Hospital.

Tuberculosis Control Programs

CHESTER A. STEWART, M.D.*
New Orleans, Louisiana

The control of human tuberculosis has received liberal attention particularly in recent years. An indication of the extent of this interest in the control of the disease and also of its annual fluctuations is provided by the number of listings on the subject contained in the Cumulative Quarterly Index Medicus. This comprehensive compilation of references to medical literature shows that approximately 2100 papers dealing primarily with various general measures considered to be of value in reducing tuberculosis were published between 1916 and 1942 (Chart 1). According to this source of information the number of articles concerned annually with controlling the disease increased from 11 in 1916 to 135 in 1936; and then remained at essentially this high level until 1939. Subsequently the literature on the subject declined appreciably owing doubtlessly to the influence of the second world war. Nevertheless, the control of tuberculosis was the subject of 74 articles published in 1942.

In 1925 references to the use of B.C.G. vaccine made their appearance in the Cumulative Quarterly Index Medicus (Chart 1). The number of articles dealing annually with this special method for preventing tuberculosis reached a maximum of 159 in 1929 and then declined rapidly. The attention this special preventive measure received recently is revealed by the 1390 articles that were concerned with B.C.G. vaccine between 1925 and 1942. These publications combined with those dealing with less specific control measures make a total of approximately 3500 articles written during the past few years on various measures for preventing tuberculosis.

The literature on this subject also reveals the evolution of the attack on the problem. Between 1916 and 1929 the contributions made to the control of tuberculosis by visiting and public health nurses, the Framingham health demonstration, preventoria, sanatoria, open air schools, summer camps, sleeping porches, and the eradication of bovine tuberculosis received considerable attention. The literature of more recent years shows that periodic tuberculin testing, mass x-ray surveys, the use of paper and miniature films, the examination of children, household groups, teachers, nurses,

*Director, Department of Pediatrics, Louisiana State University School of Medicine, New Orleans, Louisiana.

maids and the accreditation of counties constitute some additional ramifications of efforts designed to reduce human tuberculosis. Curiously, however, little or no mention is made of surveying the medical profession for tuberculosis.

For a period of several years the tuberculin testing and x-raying of thousands of children was perhaps the most vigorously promoted phase of our general program for controlling the disease, and the splendid attention children received as a result of this activity yielded valuable information. It focused the searchlight of investigation on what is now known as primary tuberculosis and clarified our concept of this introductory stage of the evolution of the disease. These studies disclosed the marvelous ability possessed normally by the majority of infants and children to bring primary tuberculosis under satisfactory control and demonstrated that this phase of the disease is an essentially non-contagious condition. These studies also revealed the ultimate development of the more

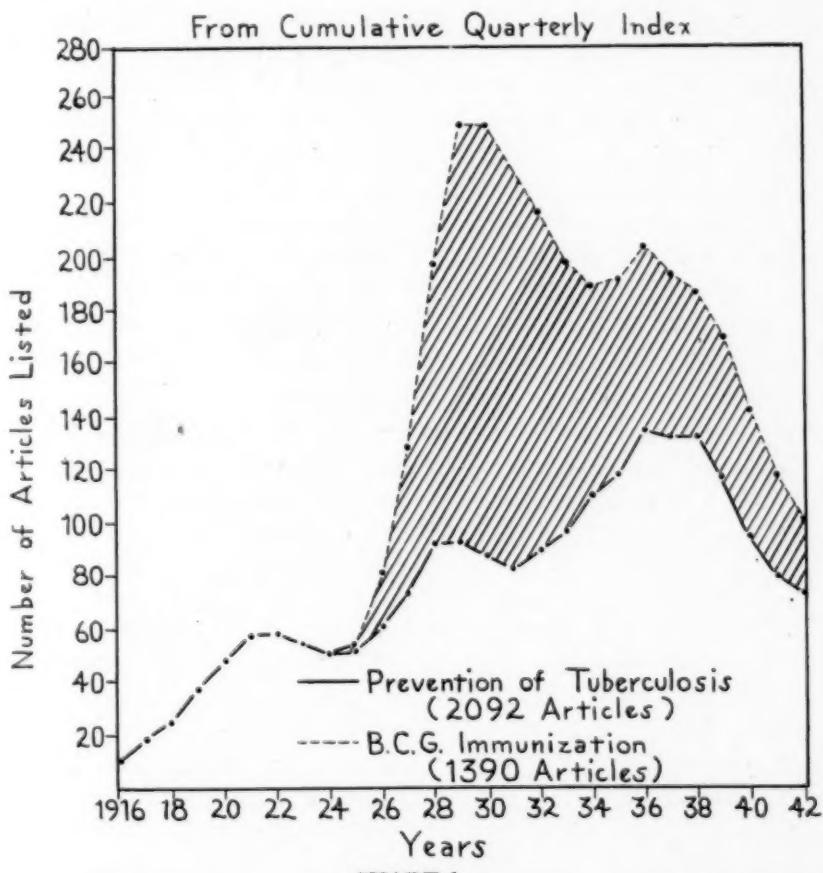


CHART 1

Number of publications dealing primarily with various measures considered to be of value in controlling tuberculosis.

serious and highly contagious reinfection form of pulmonary tuberculosis in many children whose primary disease had remained latent for months and years and observations of this character have led many investigators to doubt the validity of the commonly accepted view that an antecedent infection with tubercle bacilli augments human resistance to tuberculosis. Furthermore the studies children received demonstrated the rarity with which the highly communicable ulcerative form of pulmonary tuberculosis develops before the teen age is reached.

The recent appreciation of the fact that adults, rather than children, are chiefly responsible for the spread and perpetuation of human tuberculosis has resulted in the current trend toward focusing control programs on older age groups, one of which includes teachers and other adults employed in schools. Special incidents have emphasized the need for examining the members of this group. For example, in one instance a tuberculous teacher was discovered who was infecting the members of a High School band while instructing them in the use of wind instruments. In another instance eight members of a group of 239 teachers who were sensitive to tuberculin were found to have sputum laden with tubercle bacilli. In still another instance open tuberculosis was found in a bus driver after he had infected practically all of the 30 children he conveyed to and from school. Within a year or so six of these children were ill or dead from tuberculosis. These selected incidents demonstrate the need for controlling tuberculosis in schools. A program designed for this specific purpose has been recommended recently by the Tuberculosis Committee of the American School Health Association. The provisions of this plan are as follows:¹

1. Administer the tuberculin test to every person in the entire school system regardless of age.
2. X-ray film inspection of the chest of all adults who react to tuberculin.
3. Adequate clinical and laboratory phases of the examination of all who have shadows which might be due to tuberculosis.

In the near future the American School Health Association hopes to be in a position to award annual certificates of accreditation to schools in which communicable tuberculosis is known, on the basis of thorough surveys, to be non-existent. The ultimate objective of the Association's control program and plan of accreditation is to provide tuberculosis free schools for approximately 36 million American school children and teachers. At the present time the application of this plan is in its infancy.

Over a period of several years the Contact Infection Committee of the Academy of Pediatrics has been deeply interested in pro-

tecting children from tuberculosis not only by surveying the schools they attend but also through examining the adult members of their respective households. The program designed for this latter purpose has the approval of the Academy of Pediatrics and also of the Executive Committee of the American Trudeau Society. It contains the following provisions:²

1. Every child should be tuberculin tested at frequent intervals, and best annually, as long as he remains negative.
2. Adult family members and domestic workers should have chest x-ray films unless their tuberculin tests have been found negative. Tuberculin testing of these adults may be done by the pediatrician at the same time that the children are being tested, or preferably, whenever possible, by another physician.
3. Whenever a child is found to have a positive tuberculin reaction it is urgent that all adults closely associated with this child should have a thorough examination in an effort to find the source of infection.
4. Examination for tuberculosis of adults who have shown positive reactions should not be made by the pediatrician but by qualified specialists in this disease.
5. Open cases of tuberculosis should be segregated and removed from children until there is no longer danger of dissemination of tubercle bacilli.
6. When a case of open tuberculosis is found in a family, all children in contact with the patient who have not previously shown positive tuberculin reaction should be tested. Those who are negative at this time should be re-tested after a period of three months from the time of the last exposure.

The control programs adopted by the American School Health Association and the Academy of Pediatrics anticipate the examination of approximately forty million individuals. The task of surveying the remaining one hundred million people in the United States and of making millions of annual re-examinations is one that requires the assistance of the entire medical profession. This task challenges the American Medical Association to organize and promote a comprehensive control program designed to eradicate human tuberculosis from the United States. The ultimate attainment of this objective is contingent on placing the responsibility for detecting the disease chiefly on the private practitioners of medicine.

Until recently the diagnosis of tuberculosis was the exclusive obligation of family physicians who usually rendered this service at the nominal cost of a few office visits. Owing, however, to the crudeness of the diagnostic instruments at their disposal they seldom succeeded in recognizing the disease until it had progressed to an advanced stage of development.

The subsequent discovery of the x-ray changed this situation.

It greatly refined the diagnosis of tuberculosis and the growth of its use resulted in transferring a gradually increasing share of the responsibility for diagnosis from the family physician to the roentgenologist. The x-ray has also been employed widely by tax-supported organizations and clinics to detect tuberculosis particularly among the indigent. Thus an important third group has participated recently in the diagnosis of the disease.

The recent perfection of photofluorography and the use of inexpensive miniature films are developments which make effective nation wide surveys feasible and practical. Already several million defense workers and members of the armed forces have received photofluorographic chest examinations in a comparatively brief period of time. The ease and rapidity with which these studies have been made leave no reason to doubt that the medical profession can complete the examination of the entire population of the United States during the course of one year and can perform all necessary re-examinations at least annually.

COMMENT

The magnitude of the task of periodically testing and x-raying one hundred thirty million people tends to discourage the launching of a comprehensive control program for the entire United States. It is helpful to recall, however, that in spite of violent opposition approximately 8000 American veterinarians applied tuberculin tests to twenty-five million cattle in 1935 and performed nearly 230 million tests between 1917 and 1942 inclusive. The reduction of bovine tuberculosis to the vanishing point accomplished by a relatively small group of veterinarians in the course of twenty-five years challenges the 150,000 licensed physicians in the United States to eradicate human tuberculosis in as equally brief period of years. The accomplishment of this objective awaits the vigorous promotion of a control program which probably should include the following steps:

1. Apply the tuberculin test routinely to all citizens regardless of their age and state of health.
(Reactions to the test identify infected individuals and provide them with visible evidence that they need x-ray studies).
2. Retest at least annually all who reacted negative to previous tests. Also test all children added each year to the population.
3. Each Medical Society should either purchase and operate or contract for the use of a photofluorographic unit.
4. Make the photofluorographic service available to all members of each medical society.
5. Charge private patients a very nominal fee for this service in order to defray its cost.

6. Obtain standard x-ray films on the occasional patient whose photofluorographic study reveals evidence of abnormal conditions in the chest.
7. Perform other clinical and laboratory studies required to complete the diagnosis.
8. Repeat the entire procedure at least annually on all patients regardless of their age and state of health.
9. Continue this program until tuberculosis is eradicated.

CONCLUSION

In conclusion the suggestion is made that the American Medical Association develop, finance, and actively promote a comprehensive program which calls for the active participation of all private practitioners of medicine in a united effort to eradicate human tuberculosis from the United States. With competent leadership 150,000 physicians should be able to conquer human tuberculosis to the same degree the American veterinarians have already conquered bovine tuberculosis. Without the leadership of the American Medical Association the day this objective is attained will be greatly delayed.

CONCLUSION

En conclusión, se sugiere a la Asociación Médica Americana que fomente, suministre fondos y estimule activamente un plan comprensivo que urga la participación activa de todos los médicos privados en un esfuerzo unido para extirpar la tuberculosis humana en los Estados Unidos. Bajo una dirección competente 150,000 médicos deben ser capaces de dominar la tuberculosis humana en un grado tal como los veterinarios americanos han dominado ya la tuberculosis bovina. Sin la dirección de la Asociación Médica Americana se atrasará mucho el día en que se alcance este objeto.

REFERENCES

- 1 Journal School Health, 13: 31, (Feb.) 1943.
 - 2 American Rev. Tuberc., 47: 656, 1943.
-

Tuberculosis in Institutions for the Mentally Ill

HERBERT A. BURNS, M.D., F.C.C.P.*
St. Paul, Minnesota

The control of tuberculosis among the patients in our State Hospitals in Minnesota has been given a great deal of attention over a period of years. In 1897 Dr. H. M. Bracken, then Secretary of the Minnesota State Board of Health, presented a paper entitled, "Should the Tuberculous Insane be Isolated from Other Inmates in our Asylums and Accommodations Provided in Separate and Detached Buildings?"

The first sanatorium building in Minnesota was provided at the School for the Feeble-Minded at Faribault. This building, constructed during 1904, cared for some thirty cases of tuberculosis occurring among this group of our institutional population. One year later a similar building was opened caring for tuberculosis cases developing among the mentally ill at the St. Peter State Hospital. It was almost three years later that the State Sanatorium was opened with a bed capacity equal to that of the two buildings already provided for the feeble-minded and insane. Five years following this, the present County Sanatorium law was approved by the State Legislature.

The State Hospitals have pioneered in many branches of preventive medicine. We, therefore, cannot concede that they are virgin soil for pioneering. They may need help, but they do not require discovery. In some instances where the general hospitals in the State seem to be reluctant to take a forward step, our State Hospitals have been accepting such changes as regular procedure over a long period of time. The routine nose and throat cultures for diphtheria and blood for Wassermann has been routine for the past twenty-five years for both employees and patients on admission. All patients and employees receive typhoid and small-pox vaccinations on admission and at intervals following. This has been routine for more than twenty years, and now, for more than ten years, all employees and patients are given the tuberculin test and roentgenograms are taken when they come to the institution. Employees are checked at three-month intervals if they are in contact with cases of tuberculosis, otherwise once each year. The same procedure, with some modification, is true for the inmates. In developing our tuberculosis program, the protection of the employees has always been of first importance. No plan can

*Chief, Tuberculosis Control Unit in Mental Hospitals, Division of Public Institutions, State of Minnesota.

be successful without first planning for the security of those who carry out the work.

The population in the State Hospitals for the Mentally Ill in Minnesota does not show monthly variations of importance. There is, however, a gradual increase in the total number of patients admitted amounting to nearly two hundred per year. New admissions coming in at the rate of 2400 per year create a housing problem which has in no way influenced the discharge of cases. Overcrowding in some areas is always occurring. The transfer of patients from a congested area to another institution where the overcrowding is less evident at the moment has been the usual method employed in caring for this problem. While this method of transfer aided in the administration of the housing problem, it also succeeded in the distribution of open cases of tuberculosis from one hospital to another.

One of the unforetold results of our contagious disease control and lengthening the period of longevity is now bearing fruit. Many of our beds primarily designed for treatable cases of mental illness are being occupied in increasing numbers by older people suffering from senile and cerebral arteriosclerotic psychosis. The admission of a large number of our older people, who, during the past few years have taken over some twenty-five per cent of our beds, has actually reduced the bed capacity of the institutions by this amount. This type of admission, with our tuberculosis control program moving in, further complicates the administration of our institutions. We have many problems to be considered that are not directly concerned in the control of tuberculosis. In failing to properly consider these various and related elements, we would only add hazards to the eventual success of the tuberculosis program itself.

Tuberculosis in the Minnesota State Hospitals, as of May 15, 1944, affects an institutional population of 14,096 mentally ill patients located in seven mental hospitals, one institution for the feeble-minded, and one colony for the epileptics. The inmate population has been fruitful soil for the interchange of the tubercle bacilli as well as the development of clinical tuberculosis among these patients. There has been very little of either therapy or control attempted. In many instances where treatment would have been given early consideration under normal conditions at home or in a sanatorium, it has been delayed here in our State Hospitals. Lack of cooperation on the part of the patient, disturbed and agitated cases, make the treatment of choice, particularly if collapse therapy is being considered, a most difficult procedure. Rest, the most important single phase of our tuberculosis therapy remains the one least desirable in the management and care of more than seventy-five per cent of our cases of mental illness.

While the psychiatrist plans activities, mental stimulation, occupations, etc., for his patient, the treatment of the one developing tuberculosis demands a reversal of the treatment originally planned for the mental illness. The patient who is self-satisfied in his own day-dreams and fantasies accepts the tuberculosis routine without remonstrance, while the disturbed case and the excited manic-depressive group can be kept reasonably quiet only with adequate help and the use of sedatives.

The psychiatrist has been fully aware of the difficulties in treating tuberculosis. He has been anxious to give priority to the care of the tuberculous in order to minimize the problem as much and as quickly as possible.

The nutrition of the patient is usually as easily managed amongst the mentally ill as in any other group. Coughing and expectoration is not as prevalent in the State Hospitals as is usually found in cases attending clinics or in sanatoria. It is apparent that the cough reflex is not stimulated except in an occasional case or where there is excessive accumulation of pulmonary discharges. Most patients swallow their sputum. It would be most difficult to get specimens of sputum coughed from the lungs in more than two or three per cent of the total known patient load now in isolation. The control of tuberculosis in this group of our population presents a problem in epidemiology that must be carried over a considerable period of time in order to make its results of permanent value.

In 1934 the inmates in institutions in Minnesota² were surveyed by tuberculin test, x-rays, and examination of discharges. Recommendations as a result of this investigation were presented at this time and in many instances have been in part or fully followed. All new admissions since have been given the tuberculin test, and x-rays on admission have been taken. An attempt has been made since then to x-ray all patients and employees on a yearly basis. Isolation centers were established at this time or earlier and have been further developed. The present report attempts to present certain epidemiological facts, the interpretation of which must be left for comparison by similar workers in other institutional tuberculosis control programs.

There is much in both the fields of epidemiology and medical administration to be applied to this problem before we have fully succeeded in our control of tuberculosis as it affects this group of patients. The tuberculin test as applied to our new admissions and to the total population of the institutions shows a very high incidence of infection ranging from ninety to over ninety-eight per cent positive reactors.

All individuals were given 1:1000 O.T. read in seventy-two hours,

retested with 1:100 O.T. and read in seventy-two hours. The tuberculin test in our work at this time is of interest chiefly because it shows the very general tuberculosis infection as it exists in our institutional group. The number of positive reactors to tuberculin among the new admissions is higher than it is among the adults who are living in the inmates community. In our population of 14,096 patients we have more than 12,825 who have at sometime come in contact with the tubercle bacillus. The 1271 negative reactors are largely adults who have lived in a heavily infected environment for one or more years.

Unstable tuberculin reactors in this group are probably insignificant. This is a phenomenon that we have failed to observe among our cases up to this time. While our opportunity has been limited, it is probable that it does not occur often at the present time in a group of adults who have been frequently exposed to considerable quantities of tubercle bacilli. Isolation may have some influence in the future in changing a number of our positive reactors to negative.

Dahlstrom³ has shown some eleven per cent of his positive tuberculin reactors changing to negative, these largely in the younger groups with the most recent contacts. He has shown that such changes are much less liable to occur in family groups where there is an open case of tuberculosis. The implications from such conclusions are of importance to the future of our work in institutions. The problem of the unstable tuberculin reactors is one which is of interest in tuberculosis therapy and prevention so far as our work is concerned. Little can be added to our knowledge as it affects this group of patients at this time even though it becomes of increasing importance in the future. We have, through isolation, further limited the element of reinfection from occurring.

The 12,825 reactors so far as we know at this time are the ones that give us our problem in tuberculosis control. Roentgenograms taken of this infected group were the most direct and quickest method of appraisal. All films were placed into one of four groups, negative, Stage I, Stage II, and Stage III, according to the Classification of the National Tuberculosis Association. The only exception was that in Group I many cases were placed who showed pleural changes or shadows indicating parenchymal change which were probably due to other than tuberculosis disease. Such diseases might be and frequently were acute respiratory infection, bronchiectasis, atelectasis, abscess, etc. All were placed in the Stage I group and called I Observation cases.

The elimination of the non-tuberculous cases was and still remains an essential part of our work. While the roentgenogram is an important part of the control equipment, the bacteriological

laboratory is really the baseline from which we work out in our control of tuberculosis. All I Observation cases must be cleared through the laboratory before being released from their I Observation status. All in this group have gastric lavage, one every three months, and, if indicated, once a month for the first three months and quarterly thereafter. Roentgenograms are taken in this group at three month intervals.

All I Observation cases whose series of gastric lavages are negative for one year or more, the x-ray showing no change compared with earlier films, are returned to the negative file while those that become positive are transferred for isolation. The negative group is given a routine x-ray once a year. Gastric lavage is repeated in any case where such procedure may become indicated. The more advanced cases Stage II and III are investigated to determine their bacteriological status. Roentgenograms are taken at intervals for comparative study. Gastric lavage may be repeated once each month for three months and if still negative, once at three month intervals thereafter. Roentgenograms are taken at three month intervals.

The final disposition of consistently negative gastric lavage cases depends upon factors involving the individuals' habits, danger to others, ability to cooperate, sanitary and isolation facilities. All these factors must be considered before these cases are taken back to the floors from which they were taken to be isolated.

The Laboratory of the State Board of Health has given us its full support in taking on the extra work entailed as a result of this program. During the past year 3742 gastric lavages and 138 sputum specimens have been examined. With the amount of laboratory work carried out during the past year and before, we now feel that the total positive group is well defined at this time. A positive culture reported upon is accepted as a case of tuberculosis, and isolation is established as quickly as possible.

There have been recorded 185 bacteriologically positive cases before January 1, 1943. During the past twelve months 315 additional and current cases have been added to this total. There are 373 positive cases in isolation at the present time.

Isolation centers have been in operation for more than ten years in some of our institutions. The changes that we have brought about recently are not beginning anything new, but rather occur in the reorganization of control methods to better fit the needs of the program as applied to the population in our nine institutions.

Isolation centers have been developed in scattered institutions leaving four without any facilities for the care of tuberculosis. Within the next two years, it is hoped that others can be added to the list of institutions that do not operate isolation quarters.

The outstanding changes in the present plan have been the reporting of all cases to the State Board of Health, depending upon the laboratory for the examination of gastric lavage specimens, the immediate transfer of positive cases to isolation centers, the development of a satisfactory contagious technique in each isolation center, and the working together with the superintendents and medical staffs of the institutions making the tuberculosis control program a very important integral part of their institutional work.

At the present time we feel that the carrier and clinical load has become defined and the search for and isolation of cases a well established routine. The results of such a program should begin to influence the incidence of both breakdown and death from tuberculosis. In our infected group we found 2509 whose roentgenograms indicated either pulmonary or pleural changes. Our tuberculosis load one year ago was:

Stage I — 2147

Stage II — 263

Stage III — 99

Four hundred thirty nine cases have been discontinued from further observation, leaving us with a working load of 2170 cases at this time.

A study of these 2509 cases was made based on repeated laboratory examination, and serial roentgenograms. The x-rays were taken over a four to ten year period usually at six months to one year intervals. In 1028 cases there were no changes in the findings; the shadows, usually apical, have remained stationary for more than two years. These patients apparently had already gone through their experience with tuberculosis. It is quite possible that these cases are no longer a serious part of our tuberculosis control problem. There were 148 cases who gave evidence of having progressive lesions at the time the study was made. During the past four years there were 222 cases whose infiltration, showing evidence of progressive disease in the beginning, has undergone very satisfactory absorption, leaving a minimal stationary residual lesion. During the early period of their infiltration, these cases would have been favorable choices for collapse therapy in sanatorium practice. I feel that collapse therapy still would have aided them in clearing and probably shortened the period of conversion from positive to negative sputum. The 1028 stationary cases do not show a tendency to reactivate. Among these cases whose tuberculosis lesions become stabilized, the tendency for it is to continue inactive. Just how much this group contributes to the future case load or to the death rate from tuberculosis cannot be determined at this time. While this group of apparently inactive tuberculosis with stationary serial roentgenograms may serve the biological

function of carrier, it does not appear that in our institutions these cases add very greatly to our case load through breakdown, or to our institutional tuberculosis death rate. This is a problem in epidemiology which can only be worked out over a period of time. The group is well controlled and is ideal material for study of the carrier phase in tuberculosis.

One of the most confusing and erroneous impressions gotten from our work is concerning our tuberculosis deaths in Minnesota. During the past ten years, according to the State Board of Health, our institutions with less than one per cent of the population, have contributed from 9.5 to 15.6 per cent of the total tuberculosis deaths occurring in the State. During the past twenty-eight months, we have had 229 tuberculosis deaths reported. So far as the roentgenogram is concerned, taken serially from the time of diagnosis to shortly before death, there were ninety-one that should not have been a charge against tuberculosis. It has been customary for all deaths occurring among our cases in isolation centers to be credited to tuberculosis. Frequently there has been little evidence of tuberculosis, certainly not enough to be recorded as a cause of death. There were twenty-eight whose tuberculosis might have been given as a contributory cause, but should not have been considered as a primary cause of death. In our cases, those becoming chronic with stationary stabilized infiltrations, tend to become more and more self-limited, and, with the increasing age of the lesion, of little danger to the future well-being of the host. Only as they remain carriers of the tubercle bacilli do they play an important part in our tuberculosis control program.

Of the 110 fatal cases in which the roentgenogram showed extensive active disease, there were sixty-three whose disease developed from an initial infiltration and continued to be an acute progressive tuberculosis up to the time of death. In eight deaths there was evidence of an older infiltration. Whether this relationship was more than coincidental cannot be determined. In thirty-nine deaths, the data was insufficient to determine the early relationship of the initial lesion to the progressive lesion which later became the cause of death. There does not seem to be any relationship between the roentgenographic findings and the incidence of positive gastric lavage. There were 449 positive gastric lavage cases whose roentgenograms were reviewed, 396 of whom showed stationary lesions for a period of two years or more. They showed shadows indicating minimal calcified or fibrotic lesions with no evidence of recent or active tuberculosis. These remain in isolation because of their positive bacteriological findings, both gastric lavage and x-rays being taken at six month intervals, or

as often as indicated. Although their carrier status may continue, later x-rays show no additional evidence of parenchymal change developing.

The finding of tubercle bacilli was associated with progressive lesions Stage I in 12 cases; Stage II, 22 cases; and Stage III, 39 cases. The tubercle bacilli carrier is not identified by any known means so far as the roentgenogram is concerned. Usually the gastric lavage specimen is the only epidemiological approach to the problem of isolation. It is apparent that the number of deaths and the number of active progressive cases, as well as the number of active cases discharging tubercle bacilli are relatively few in any one year compared to the total in the group who show evidence of parenchymal disease. The largest number of positive gastric lavage cases occurring at any one time, is not among the toxic or those showing evidence of progressive disease on the roentgenogram, but the quiescent, usually Stage I, cases whose disease has resolved to a carrier state. Just how extensive should isolation facilities be in our State Hospitals is a problem that must be worked out for each group of institutions concerned. We have now converted four per cent of our bed space for isolation purposes. This space at the present time seems adequate for our needs. We can, if the need arises, increase our isolation beds to five per cent of our capacity. It is hoped, however, that by proper screening and follow-up, with prompt isolation of positive cases, the requirements within the next two to four years will be reduced below four per cent rather than increased above this figure.

We have a considerable number of patients leaving our institutions each year through various channels, chiefly parole, discharge, and escape; there are usually some 2500 "out" patients. One of the most difficult administration elements of our program is included in this group. Superintendents of the institutions have kept records on each case. They are instructed to notify the State Board of Health at any time a patient leaves the institution. A copy of the superintendent's letter goes to the County Sanatoria, whose field service is usually prompt in checking on these absentees. To date our control of these cases is not satisfactory. It is, however, improving and we feel sure within the next few months it will be working smoothly all along the line from the State Hospital to the controlling agencies at home.

CONCLUSIONS

The State Institutions furnish a very good field for the epidemiological study of tuberculosis. The administration of the tuberculosis control program must vary with the group of institutions involved. The over-all picture of our institutional problem very

easily becomes a part of the control picture in the State as a whole. We cannot expect to improve our position in tuberculosis control statistically or epidemiologically until we get together on these reservoirs of infection that still remain among us. This is being done in Minnesota and the results will be further proof of what can be accomplished by very simple inexpensive control measures. Such measures we have found practical to be carried out under the handicap of war conditions with limited supplies of material and personnel. The results are so promising that we should not hesitate to initiate similar control programs wherever and whenever possible.

CONCLUSIONES

Las instituciones para enfermedades mentales de los Estados suministran muy buen campo para el estudio epidemiológico de la tuberculosis. La administración del plan para el control de la tuberculosis debe variar de acuerdo con el grupo de instituciones implicadas. El aspecto total de nuestro problema institucional se convierte muy fácilmente en una parte del aspecto de control en todo el Estado. No podemos abrigar esperanzas de mejorar nuestra posición en el control de la tuberculosis desde el punto de vista estadístico o epidemiológico mientras no nos pongamos de acuerdo en cuanto a estos depósitos de infección que todavía quedan entre nosotros. Se está haciendo ésto en Minnesota y los resultados darán prueba adicional de lo que se puede realizar con medidas de control muy sencillas y baratas. Hemos encontrado que es práctico llevar a cabo estas medidas a pesar de las desventajas que se presentan durante la guerra con la escasez de materiales y personal. Los resultados son tan prometedores que no debemos vacilar en iniciar programas semejantes de control dondequiera y cuandoquiera que sean posibles.

REFERENCES

- 1 Bracken, H. M.: Eighth Biennial Report, State Bd. of Health, Minnesota, 1895-98, 272.
- 2 Burns, Herbert A.: "A Study of the Incidence of Tuberculosis in State Institutions in Minnesota," *Am. Rev. Tuberc.*, 33: 813, 1936.
- 3 Dahlstrom, Arthur W.: "The Instability of the Tuberculin Reaction," *Am. Rev. Tuberc.*, 42: 471, 1940.

Tuberculosis in Prisons

O. L. BETTAG, M.D., F.C.C.P.*
Pontiac, Illinois

HISTORY

The records of many state prisons have repeatedly reported the high incidence of tuberculosis. In some of these states today, little or nothing is done to detect or scientifically treat tuberculous inmates. There is meager medical data available in American literature and less in the foreign. Surprisingly, however, an excellent article on "Tuberculosis in Penal Institutions" was incorporated in the Congressional Record in 1904. It had many valuable suggestions such as "A compulsory law compelling the examination of every admission to any penal institution for the purpose of early detection of the disease; the construction in every state of a special hospital or sanatorium, favorably located and properly equipped for the treatment of tuberculous subjects, and the transfer of all such to this institution from the jails, penitentiaries, reformatories and prisons; provisions for out-door employment for all apparently cured cases, and the feasibility of a provision by the Federal Government for an inquiry into the status of tuberculosis in penal institutions of the United States for the purpose of gaining statistical information of value."¹

Twenty-five years later, in 1929, every state and federal prison was visited by a physician for the National Society of Penal Information. From the available statistics "about 1.1 per cent of the inmates of penal institutions were known to be affected with tuberculosis. Were physical examinations and methods more complete and searching, a larger number of cases would doubtless be recognized." The method of caring for tuberculous patients varied from separate hospital facilities to the hospitalization of only the most pronounced cases and leaving the others in their cells with the general population. Some of the tuberculosis hospitals had their greatest value in providing for the segregation of the infected inmates from the general prison population.²

The Commissioner of English Prisons, after thirty-six years of experience, wrote in 1936, "No systematic investigation into the medical aspects of crime or of prison medical administration in early times is practicable, for apparently no history of English prisons or of their administration exists."³

*Tuberculosis Controller, Illinois Department of Public Safety.

Commenting on the subject of prison hospitals in 1939, the Medical Section of the American Prison Association noted that "of the 251 federal and state prisons there are at least 119 that have very inadequate medical service and show a gross neglect of the physical and mental care of their wards. In less than a dozen state prisons is adequate medical and surgical care being given to the inmates. In most cases, prisoners stand a chance of release from prison in a more deplorable state than when they were committed to incarceration."⁴

Today, 1944, based on communication with the chief executives of forty-eight states,⁵ and the federal government,⁶ there is considerable variance in detection and treatment of tuberculous inmates and the parole attitude toward them.

WHY TREAT TUBERCULOUS PRISONERS?

The communities to which the inmates return expect reformed and healthy citizens. Approximately 10 per cent of the total Illinois prison population leaves annually, and 95 per cent is destined to be released, according to recent figures from the State Department of Public Safety.⁷

Those convicted have a right to reasonable care, and this should include sickness and injuries, and inhabitation in at least average sanitation. They should not become infected with tuberculosis because of this commitment, nor should institutional employees become needlessly exposed to this disease.

A. LOCAL ADMINISTRATION

I. HOSPITAL

Building:

Prior to 1939, tuberculous patients were placed in a separate section of the General Hospital and treatment consisted of rest, food, and cod liver oil.

A central, modern tuberculosis hospital was opened October 3, 1939, at Pontiac, and a tuberculosis physician engaged. This was done on the recommendation of the Chicago Institute of Medicine, for the treatment of the tuberculous incarcerated males from the five State of Illinois penal institutions. The State Reformatory for Women, Dwight, hospitalizes its own tuberculous patients and uses medical consultation. The Vandalia State Farm, with its misdemeanor offenders, follows a similar program and is prevented by statute from transferring inmates to an Illinois penitentiary.

The hospital is a two-story, fire-proof, eighty bed capacity building with a large proportion of windows. The unit is of ward type with single rooms for post-operative and seriously ill patients.

Colored patients are kept on one side and whites on the other. In general, the positive sputum patients are placed on the second floor and the negative sputum patients on the first. A special yard adjacent to the hospital has been provided for up-patients. When the weather is inclement, cure is taken in large solaria adjoining the main wards (See Fig. 1).

X-ray:

By December 14, 1939, a modern 100 milliamperage diagnostic x-ray machine with stereoscopic and Bucky attachments was installed. Prior to this, x-ray examination within the institution was not available. Since December 8, 1941, this work has been done by inmates, as the registered technician is on military leave. The quality of the finished x-ray films has received the highest praise from a Mobile Army Examination Unit. When speed has been required, as many as eighty-five exposures of 14" x 17" films have been taken in one hour. To date, 6820 x-ray and 1251 fluoroscopic examinations have been made. All x-ray films are interpreted in detail by the physician and written reports are made. The same procedure is carried out in the fluoroscopic work (See Fig. 2).

Laboratory:

Sputa examinations are made monthly by the State Department of Public Health. At times, it becomes necessary to have sputa collections certified by the guard. All patients with converted sputa,

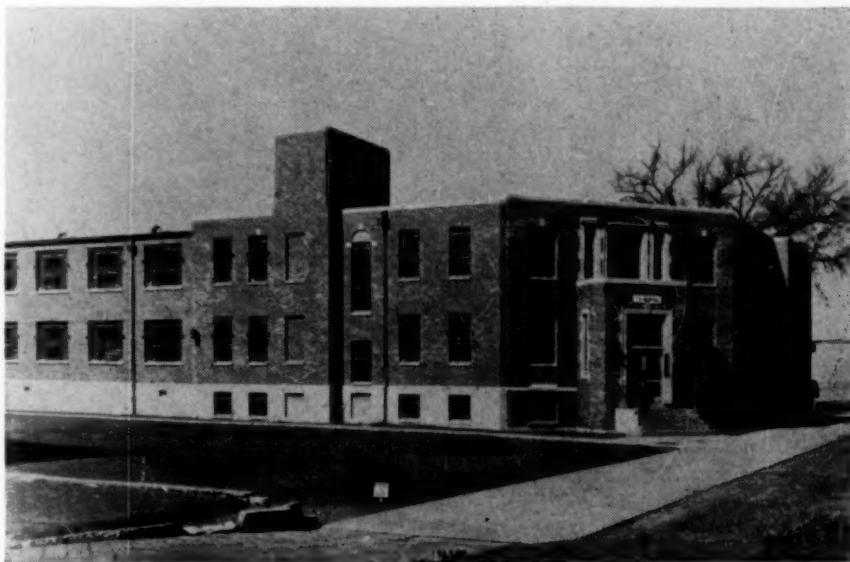


Figure 1: Central Tuberculosis Hospital (Pontiac Branch)

and diagnostic cases, have gastric lavage examinations. Some studies are made locally for the purposes of quicker diagnoses, teaching, etc. Tissue sections are studied by the Illinois Research Hospital Department of Pathology.

Laboratory procedures, exclusive of tissue study, should be performed by registered technicians where the patients are hospitalized.

Laundry:

Linen and blankets are autoclaved before being sent to the main laundry. Mattresses and pillows are similarly sterilized prior to being used by other patients.

Cells from which patients are received are cleaned and all linen and blankets sterilized.

Barber Care:

Barber care is furnished at the bedside through the institution barber department. The equipment is sterilized in compound creosolis before re-use on another patient.

The inmate personnel have a small barber shop within the hospital. Separate equipment is used and sterilized daily with formaldehyde fumes.

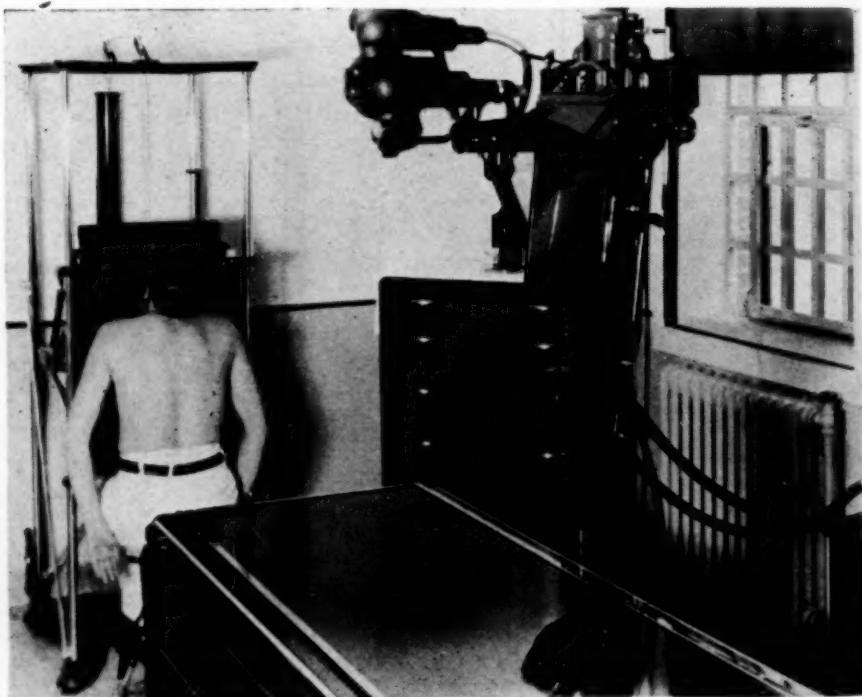


Figure 2: 100 Milliamperage Diagnostic Unit.

Radio:

Loud speakers are placed throughout the hospital but are silenced during the afternoon rest hours and from 9:00 p. m. until 9:00 a. m. Programs are selected and distributed from a central radio room. The use of bedside earphones would be more restful.

Church:

Patients with three hours sitting time and full bathroom privileges are permitted to attend the institutional weekly church services. For other patients, the services are conducted in the large wards. The institution is staffed with resident Catholic and Protestant chaplains, and permits visits by other ministers.

Movies:

Educational movies are shown at the hospital on a voluntary basis by the local Tuberculosis Association and the nearby county sanatorium. Patients with sufficient up-privileges are permitted to attend the weekly institutional movies.

Library:

Books, prior to being discarded by the institution library, are sporadically received. Considerable good could be accomplished by improvement of this situation.

Visiting:

Bed and limited up-privileged patients are permitted visitors away from the other patients but under the surveillance of an officer. The visitors wear gowns. Exercise patients go to the institutional visiting room.

We have encouraged inspection tours of the hospital by lay and medical groups. This has not been resented by the patients.

Clothes:

Inmate personnel wear white clothes on duty. Showers and change of clothing are required before returning to cells.

Officers, however, wear their uniforms home, in spite of suggestions for the institution to provide special hospital wearing apparel.

Personnel Changes:

The frequent change of officers and inmate personnel causes inefficiency and exposes more individuals to tuberculosis with its possible litigation.

Insane Patients:

Non-violent patients with active tuberculosis can be cared for

locally if special mental care is not needed. Violently insane patients and other psychotics requiring specialized attention should be treated in the mental division of the department, and chest consultation service employed.

Medical Check-ups of Personnel:

The physician, registered nurse and guards receive tri-monthly chest roentgenograms. The inmate personnel have monthly weighing and blood sedimentation rate determinations, and chest x-rays are made every three months.

Reports:

Monthly reports of each hospital patient, including admissions and discharges, are made to the Department of Public Safety. The "Diagnostic Standards and Classification of Tuberculosis" of the National Tuberculosis Association are used. All treatments, important events and personnel changes are recorded.

Annual reports with recommendations are made.

Nursing, Nutrition, and Discipline:

Because of their importance, these subjects are considered separately.

II. NURSING

The nursing staff consists of one part-time female registered nurse with special training in tuberculosis, and inmate nurses. The registered nurse is responsible directly to the physician.

A guard accompanies the registered nurse, at the suggestion of the warden. To us, the precaution seems superfluous. The patients and inmate personnel have an attitude of respect and appreciation for good nursing care.

The inmate nurses are assigned to the hospital by the placement officer on a voluntary basis. Nurses with long sentences are not permitted to work on the evening and night shifts. The local prison officials believe there is less risk of escape with such a plan. After assignment, the man is placed in the diet kitchen within the hospital. This is to familiarize him with hospital care of dishes, food, etc. He is next moved to day ward work under supervision. If he shows average intelligence, willingness to work and is reliable, he rotates first to the evening shift and then to the night shift.

The inmates are attracted to hospital work because of better and more food, access to daily showers, frequent clothing change, more recreation privileges, and fewer hours in the cellhouse. We believe extra good time should be given the nurses because of the

additional risk assumed in the constant exposure to infectious disease.

The removal of a nurse from service because of laziness, sulky attitude, etc., should be a part of his prison record and considered in his future assignments. The immediate placement in other desirable prison employment is demoralizing. The inmate should, however, be permitted to ask and receive a transfer to other employment if a justifiable explanation is given.

By merit and tenure of service a "head nurse" is chosen by the physician and registered nurse and is directly responsible to them. He has quarters in the administrative portion of the hospital and is called, as indicated, by the evening and night shifts. Several tuberculous patients have assisted with nursing as part of their tolerance exercise and ultimately were retained as regular inmate nurses.

Personal feelings enter into the handling of uncooperative patients, e.g., a bed patient who walks to the bathroom may later be denied bedside care, at the inmate nurse's discretion. Such matters are often unknown to the physician or registered nurse, as inmates have a silent code.

A recreation room is set aside for the use of the inmate personnel. A walled-off yard for exercise patients is also used by them. The large institutional play yards with their football, baseball, and basketball quarters are available. The regulation of recreation hours and the return to the cellhouse shortly after duty has improved the efficiency of hospital management.

Classes conducted for inmate nurses by the physician and registered nurse include clinical signs, treatment and nursing procedures. In spite of the lack of trained nurses, much good work has been accomplished. No cross infections have occurred either in surgery or treatments; decubital areas have happened rarely and only on debilitated and moribund patients. Oxygen has been administered in acute dyspnea from spontaneous pneumothorax, massive hemorrhage, etc., while the call for the physician was being placed.

At least one full-time nurse in charge of each shift is highly desirable. The need has been recognized by the Department of Public Safety, and recent legislation has provided for such employment.⁸ The present scarcity of female and male registered nurses has not permitted the approved changes.

III. NUTRITION

Institutional feeding is usually a problem. This is true in penitentiaries and especially in a penal hospital treating a chronic disease, where the grapevine system reaches perfection. The pa-

tients strongly believe good food is purchased, but that its preparation, serving, and variety are poor.

Menus, carefully prepared by trained personnel; with thought as to balanced diet as well as economy, were received for several years from a nearby sanatorium, but not followed. Special diets are a farce, regardless of the fact that diet lists are supplied to assist the kitchen. Extra nourishments have lacked fruits, malted milk and the like. Much of the mental upset of seriously ill patients is the result of their not receiving the prescribed diets. The correction of the situation is not within the authority of the physician; however, it is his responsibility to repeatedly report it. Improvements are made sporadically and often temporarily. The officer-cooks and stewards are not well trained, and they dislike preparing food which should be individualized to cases.

Permission has been received from the Director to engage a male dietitian.⁹ There are, however, only three male registered dietitians in this country.¹⁰ The solution appears to be in the engagement of a female dietitian or the "training of cooks in hospital menu planning who would be willing to cooperate in this matter." An offer to do the latter has been received from the Division of Home Economics and Nutrition of the Illinois Department of Public Welfare.¹¹

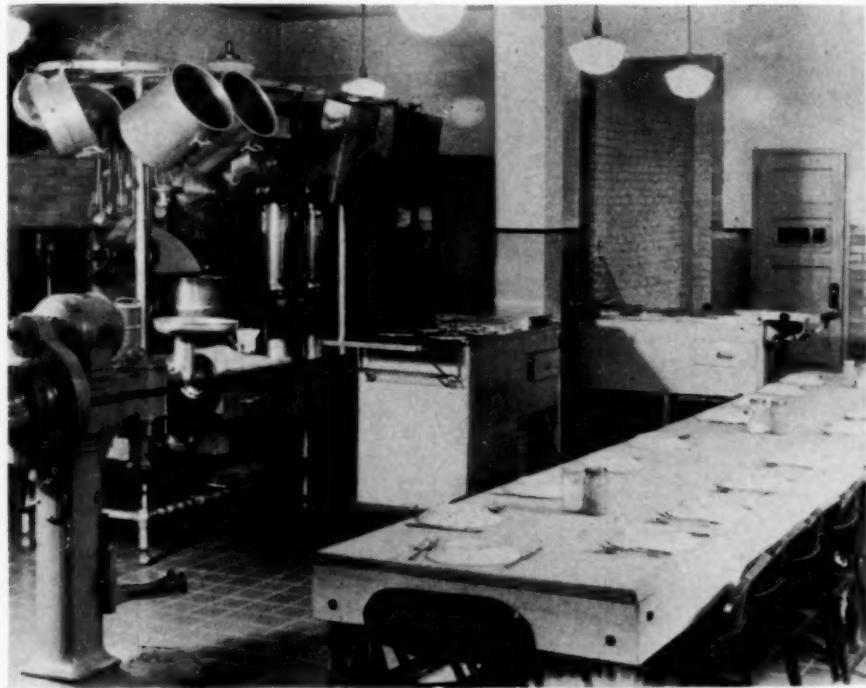


Figure 3: Central Hospital Kitchen (Note Food Conveyors)

Food is prepared in a central kitchen adjoining the General and Tuberculosis Hospitals and is served at the bedside from heated food conveyors. Originally, all meals were eaten during the eight-hour day shift. Gradually this has been spread over twelve hours. The regular diet is supplemented with forty-eight ounces of pasteurized milk and the daily requirement of vitamins A and D. The meals, in spite of the above criticism, are quite well tolerated, as evidenced by weight gains in practically all patients except the seriously ill (See Fig. 3).

Patients are asked regarding the quantity of food desired. This has decreased the garbage about fifty per cent. During the past four years the garbage has been disposed of through incineration. Prior to this it was sent to a piggery.

The inmate personnel eat in a small dining room within the hospital and are not permitted in the central kitchen except to obtain and return food conveyors. Separate dishes are used for patients and personnel. Dishes from patients are sterilized following their use, while those from the personnel are hand washed.

In most of the prisons of this country the diet for tuberculous patients is increased by the addition of milk and eggs.² In the old English prisons, the diet consisted of bread, potatoes, meat, cheese, ale and wine.³



Figure 4: Ward Patients.

IV. TREATMENT

The treatment is essentially the same as in most of the modern sanatoria. All patients are re-x-rayed every three months, have monthly sputum examinations and blood sedimentation rate determinations, and weekly weights, general condition permitting. Pneumothorax patients are masked and fluoroscoped before each refill and x-rayed monthly. Exercise patients have monthly roentgenograms and similar out-patients studies are gradually spaced, but never longer than six months.

Bed Rest:

Absolute bed rest is the most difficult therapy to administer. Enforced rest would appear to be absolute, but there are many flaws. The employment of more registered nurses and better officers should improve the situation (See Fig. 4).

Collapse Therapy:

All forms of collapse treatment are used. The patients have been most cooperative in the acceptance of these procedures. No pressure is used in persuading the patient's judgment. In addition to the consent of the patient, written permission is obtained from the nearest of kin. Two patients have refused this type of treatment: one with unilateral pneumothorax did not wish bilateral pneumothorax, another desired pneumothorax in preference to

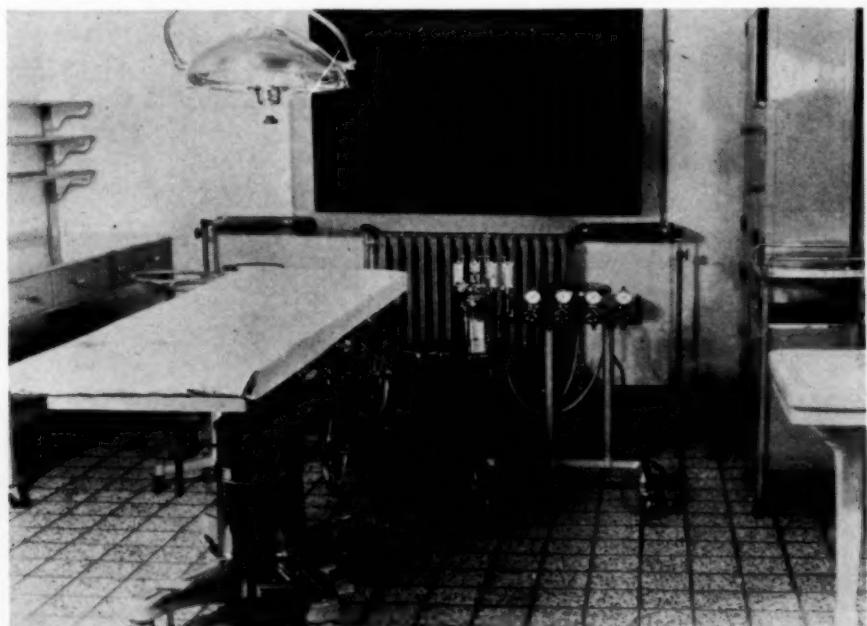


Figure 5: Operating Room with Gas Anesthesia Apparatus.

phrenic nerve paralysis. It is not unusual to receive requests from the patients for some form of surgical intervention. Forty-three per cent of all inmates hospitalized at Pontiac with active pulmonary phthisis have had collapse therapy.

Due to the lack of a competent anesthetist, all operative work was done under local anesthesia until eight months ago. We now use intravenous and the various gas anesthesias. Positive pressure is also available since we have been fortunate in obtaining the services of a well trained commuting anesthetist. Surgical assistance, for the most part, has been from the inmate nursing staff. Occasionally, physicians interested in chest diseases have rendered voluntary help. There have been no cross infections, serious accidents or surgical deaths. Black silk technique is used (See Fig. 5).

Of the patients having collapse procedures, thirty-eight per cent have had sputum converted to negative.

Treatment Statistics, October 3, 1939, to May 23, 1944:

Artificial Pneumothoraces (52 patients)	1255
Phrenicotomies	1
Phrenic Nerve Paralyses, Temporary	19
Thoracoscopies	1
Pneumonolyses	6
Monaldi Drainages	4
Thoracoplasties, Stages (See Fig. 6)	7
Intercostal Nerve Paralyses, Multiple	1
Thoracenteses, With or Without Lavage	47
Aspirations, Other Parts of Body	29
Laryngoscopies	1
Bronchoscopies	1
Excisions of Axillary Glands	1
Incisions and Drainages	5
Fistulectomies	1
Granulomectomies, Perineal	4
Orchido-epididymectomies	1
Removals of Bullets from Hemithorax	1
Ultra-Violet Light, Extra-pulmonary Lesions	10046

V. DISCIPLINE

Discipline in any hospital is important and the ability to enforce it without being offensive is, at times, quite trying. These patients have previously been behavior problems while apparently well. In addition, their average education is not beyond grade school.

The necessity for treating one as an invalid, due to insidious and painless tuberculosis, is often difficult to convey.

Prisoners in the institution are under the watch of guards. The same procedure is used in the hospital. Each floor is under the supervision of officers twenty-four hours daily. Compliance with rules and privileges depends upon the strictness of the officers. During the first year, discipline was a major problem, but during the second year it became of little concern. With the resignation of an officer-in-charge who had many years of valuable penitentiary hospital experience, and the frequent placement of new officers, it has become more difficult to maintain discipline. In addition to the commotion usually experienced as the result of administration changes, there has been attraction of the more qualified personnel to better paying fields, including nearby war plants. As the officers are placed, transferred, or dismissed by the warden, their cooperation with the tuberculosis program varies directly with the attitude of the warden toward the same program.

Treatments, visiting and up-privileges, except bathroom privileges, are carried out in the regular shift between 8:00 a. m. and 4:00 p. m. This relieves the officers on the other two shifts of many details which might be misinterpreted. Educational talks and written articles have assisted the patients and officers in a better understanding of the dangers of improper treatment of this disease.

New patients, on admission, come to the physician's office for the purpose of examination, to receive an explanation of their disease, probable future treatment, and to learn of hospital conduct. An important point has been the stressing that all patients will be considered as patients and not as prisoners unless their conduct calls for it. The same procedure applies to the inmate help. An unruly or uncooperative patient may be changed to the better by his fellow patients if the physician will speak logically but loud enough for the others to hear and later reason with the offender. Practically every problem-patient has voluntarily apologized for hasty talk or action. A true feeling of forgiveness should prevail and past infractions forgotten, for the most part, in future dealings with the patient. A physician should have a sense of humor, even though at times it becomes necessary to deal sternly. Promises should be fulfilled.

Smoking, being out of bed without permission, sexual irregularities and other breaches are reportable. The first offense results in a conference between the patient and the physician with an explanation of the reasons why the patient must, for his own welfare, follow a certain routine. Placing an inmate on his honor gives him a feeling personal interest is being shown and kindness used. Contrary to popular belief, most of the inmates are polite,

considerate and optimistic. They wish to become well and to be discharged from the penitentiary. In their minds, tuberculosis is the most dreaded of the common diseases.

When conduct is repeatedly bad, a comment to this effect in the physician's report to the parole board seems justified. Likewise, a complimentary remark of good conduct is indicated. The patients should know that reference to their cooperation may be at the parole board's perusal when their case is considered. Repeated offenders are dealt with more sternly depending upon the extent of their disease. Discontinuation of up-privileges and movies, or, if necessary, isolation in a single room, serving of low caloric diet, withholding mail and the employment of a bedside commode are quite effective. Patient cliques are disbanded by separating the leaders.

Either the judgment of the physician or the inmate must be dominant. The use of solitary confinement has, therefore, been used. For exemplary reasons, apparently well patients were sent to solitary for repeated offenses and major infractions, such as fighting, insolence and threats to officers. As we eventually believed other and more humane methods to be just as effective to correct behavior problems, we discontinued the procedure of withholding food and solitary confinement. Solitary confinement is the placing of a prisoner in a darkened cell with limited food and bedding. Deadlock would appear to serve the purpose where strict immediate discipline is necessary. This is confinement to a lighted cell where there are barred doors, regular meals and bunks, but no writing or incoming mail privileges. Patients are visited daily by the physician or nurse while in solitary or deadlock. In general, no sudden weight losses have been experienced by the use of the latter procedure and, in most instances, patients have shown improvement, as the possibility of breaking rest treatment has been lessened.

In a few more serious breaches of discipline, the institution officials discontinue visiting privileges for some months and demote the individuals to lower classification grades with a loss of good time.

The present procedure in enforcing discipline is for the officer to report the offense to the disciplinarian, who, in turn, consults the physician regarding the patient's disease. This tends to relieve the physician of the stigma of being an enforcement officer.

Employment in the prison tuberculosis hospital of tuberculous civilians in arrested status would appear to have at least two advantages: the sedentary work affords an excellent opportunity for post-sanatorium patients to acclimate to normal life, and to pass on their sanatorium training to the inmates.

B. CONTROL PROGRAMS ELSEWHERE

I. OTHER ILLINOIS STATE PENITENTIARIES

This group includes the major portion of the inmate population. X-ray apparatus is lacking in one penal branch, and inadequate at two other centers. Chest films are often misinterpreted. No modern systematic detection of the possible tuberculous has been made. Sick lines are held early in the morning when tuberculous patients have their lower temperatures. Eventually, some patients are x-rayed and hospitalized.

Active cases of tuberculosis are usually permitted too many privileges and their transfers to the central tuberculosis hospital are too delayed. Apparently, avoidable disease progression has occurred because of improper rest, prolonged waiting and unsuitable method of transfer.

The employment of a mobile photo-roentgenographic unit, central interpretation of x-rays, standardization of treatment, freer use of consultation, and quicker and more closely supervised transfers are definitely indicated.

II. STATES⁵

The problem is recognized by all states except fourteen. The latter, geographically, are four Eastern, three Central and seven Western units. The inmate population of these fourteen constitutes approximately sixteen and two-thirds per cent of the total state penal population.

Fifteen states routinely x-ray the chests of all inmates or of positive tuberculin reactors. In three states, tuberculin testing is a preliminary diagnostic procedure. Two use the Mantoux and one the Patch Test. One state routinely fluoroscopes and follows with chest plates of patients showing pathology. Twenty-five states have separate hospitalization sections of various descriptions. The first central penal tuberculosis hospital was established in New York, January 22, 1918. However, only one of their nine branches routinely employs chest x-ray examinations.

With few exceptions, the medical and surgical work is done by general prison physicians. Modern collapse therapy is seldom used. Patients, in general, may expect better care in those states referring the tuberculous to the various non-penal sanatoria. There are a few exceptions: a Southern state has a penal unit adjacent to the state sanatorium and the regular sanatorium staff treats these patients; and another commonwealth transfers patients to the Medical College Hospital for thoracoplasties and other major collapse treatments.

III. FEDERAL

The medical section of the federal penal system with its six penitentiaries is the responsibility of the United States Public Health Service. "Although the x-ray examination is the most effective diagnostic procedure, it is not routinely used because of the expense. It is ordered only when history, complaint or physical findings are suggestive of pulmonary disease."¹²

These statements are interesting in view of others in the same report, namely: "Because of crowded conditions in penal institutions unusual care must be exercised in detecting active cases, not only for the purpose of treating the afflicted individual but also for the purpose of protection of the inmate population at large. The disease is noted for its insidious onset and tendency to advance without subjective or objective symptoms."

"A special sanatorium is not available for the segregation and care of tuberculous prisoners, but all cases in need of prolonged hospital care are transferred to the Medical Center for Federal Prisoners, Springfield, Missouri."¹³

IV. OTHER NATIONS

Italy: Italy provides a special sanatorium on the Island of Pianosa for its convicted. It has one-hundred twenty beds with provisions for three-hundred sixteen beds.^{13,14}

Canada: The Dominion of Canada has an inmate population of over ten thousand in the reformatories, gaols, prisons and penitentiaries. There is no case finding or control program. They do not appear to have x-ray units in any of the major branches.¹⁵

C. PAROLE

The attitude and decisions of the Parole Board are an integral part of the control of tuberculosis. We have had splendid co-operation with our medical recommendations of cases studied by the Illinois Parole Group.

Until quite recently, it has been the policy in Illinois to retain the tuberculous inmates requiring treatment. Patients having served maximum sentence must, by law, be released. Arrangements, however, are usually made to continue with non-penal hospitalization upon release of such patients. The discharge of all other patients is at the discretion of the Parole Board.

Those with essentially hopeless tuberculosis and a very brief prognosis have extra consideration. They quite often, but not necessarily, obtain a medical parole. The relatives of these patients, however, must furnish proof of approved hospitalization. For obvious reasons, such patients and relatives prefer the exitus to occur outside of the penitentiary.

Patients believe being in the tuberculosis hospital retards their chance of parole. This can prevent an ill patient from reporting to the morning sick line, with its subsequent possible hospitalization. This is also an indication for routine x-ray examination of all inmates.

There is considerable variation in policy throughout the nation on this subject. Most of the states have no set procedure. States in which it is the practice to commute the sentence, or parole or pardon the inmate are usually those in which the problem is thought to be of minor concern or where it is of major importance but adequate hospitalization facilities are lacking. One small New England state with few inmates transfers the tuberculous to another state penal center. Several states, however, have had bad experiences with the paroled sick and, therefore, seldom grant earlier releases. This policy is usually followed where hospitalization is readily available. There are striking exceptions. In one state, with an excellent control program, the Parole Board is without jurisdiction to release a tuberculous patient if the attending physician is of the opinion the patient's condition would endanger public health. The law of that commonwealth is as follows:

"An inmate of a public charitable institution or a prisoner in a penal institution who is afflicted with syphilis, gonorrhea or pulmonary tuberculosis shall forthwith be placed under medical treatment, and if, in the opinion of the attending physician, it is necessary, he shall be isolated until danger of contagion has passed or the physician determines his isolation unnecessary. If at the expiration of his sentence he is afflicted with syphilis, gonorrhea or pulmonary tuberculosis in its infectious or contagious symptoms, or if, in the opinion of such physician as the authorities may consult, his discharge would be dangerous to public health, he shall be placed under medical treatment and cared for as provided in the institution where he has been confined, until, in the opinion of the attending physician, the said symptoms have disappeared and his discharge will not endanger the public health."¹⁶

In a few states, jail inmates with tuberculosis are transferred to the state penitentiary for treatment. Hospitalization and follow-up care is made a condition of parole in some states. Tuberculous parolees of another state on relapsing are returned to the institution and given further treatment.

In Illinois there is apparently no distinction for parole based on sex. In some of the other states, women inmates appear to receive sick paroles more readily.

The immediate medical recommendations for parolees are fulfilled. This applies to their need for future treatment, approval of the non-penal hospital, mode of transfer, and necessity of an attendant. Thereafter, we have no contact with the patients even though they are under parole for three years. Future medical

arrangements are apparently settled between the parolee and the parole agent. As long as the paroled patient is accountable to the Department of Public Safety, it would seem to be the latter's responsibility to place him under the supervision of the tuberculosis division of the Department.

D. STATISTICS

Tuberculin Test:

Full dose second strength purified protein derivative tuberculin was given 3,113 inmates with 76 per cent positive reactors. When considered by race, 85 per cent of the colored and 73 per cent of the white reacted positively. A thousand records were selected, based on length of incarceration, and divided into two groups. Of the 500 in prison less than three months, 51 per cent had positive



Figure 6



Figure 7

Figure 6: Seven Rib Thoracoplasty (Local Anesthesia).—Figure 7: Acute Tuberculous Pleurisy and Peritonitis. (Found on Tuberculin-X-ray survey. Did not report to sick line).

tuberculins; of the 500 retained over eighteen months, 89 per cent were tuberculin positive. Two-hundred thirteen officers were similarly examined and 81 per cent gave positive readings (See Fig. 7).

Incidence:

The positive reactors of 3,113 tuberculin tested inmates had 14" x 17" x-ray examinations of the chest. Seventy-two or 2.3 per cent had significant chest opacities. Slight thickenings of the pleura were noted, but are not a part of this report. Twenty-eight (26 pulmonary, 2 pleural), or 0.89 per cent active cases of tuberculosis were diagnosed. This is a morbidity rate of 899 per 100,000, or *seven times greater* than for the State of Illinois (See Fig. 8).

Figure 8
TUBERCULOSIS MORBIDITY RATE PER 100,000

Illinois	[redacted]	114
East St. Louis	[redacted]	116
Chicago	[redacted]	167.5
Illinois Penal Institution, Pontiac Branch	[redacted]	899

None of the 213 officers had active pulmonary tuberculosis, although ten had findings ranging from suspicious to apparently cured far advanced pulmonary tuberculosis.

Admissions:

Two-hundred thirteen patients, 41 per cent white and 59 per cent colored, have been admitted. The average percentage of white and colored in the general inmate population is 70 per cent and 30 per cent respectively.

The annual entrances varied as follows:

From	10-3-39 to 6-30-40	7-1-40 to 6-30-41	7-1-41 to 6-30-42	7-1-42 to 6-30-43	7-1-43 to 6-1-44	Totals
Joliet	18	14	11	11	37	91
Menard	14	7	5	6	9	41
Pontiac	29	21	13	15	11	89
Totals	61	42	29	32	57	221*

*Includes 8 re-admissions.

Analysis of the Pontiac admissions is of interest. Approximately 52 per cent (46) came from the General Hospital sick line. The other 48 per cent were the positive tuberculin x-ray (37) and Army x-ray (6) groups. Eight deaths occurred in the patients referred from the sick line and one from the other groups.

Diagnoses:

Observation Cases—No Active Pulmonary	%
Tuberculosis Found	23 10.8
Active Pulmonary Tuberculosis: Minimal	42 19.7
Mod. Advanced	40 18.77
Far Advanced	74 34.78
Pleurisy with Effusion, Probably Tuberculous	8 3.755
Lymphadenitis, Probably Tuberculous	7 3.286
Osteomyelitis, Probably Tuberculous	8 3.755
Miliary Tuberculosis, Probable	1 .468
Fibrosis, Type Undetermined	2 .939
Pneumonitis, Type Undetermined	2 .939
Bronchiectasis	1 .468
Emphysema and Bronchial Asthma	1 .468
Osteomalacia	1 .468
Arthritis	1 .468
Lymphogranuloma Perineal	1 .468
Bullet in Chest	1 .468

Discharges:

By Reason of Death	31
To Cellhouses, Active Pulmonary Tuberculosis not Found	19
To Cellhouses on Out-Patient Status, Arrested Cases	75
To Outside Sanatoria	31
Released by Expiration of Sentence	10
Returned to Psychiatric Division	3
Administrative Transfer to other Branches	2
To Joliet for Abdominal Surgery	1
Total	172

Death Rate:

A review of the death certificates from Menard, Joliet and Pontiac for the past eight years shows tuberculosis (pulmonary and non-pulmonary) accounted for 115, or 22.6 per cent of all deaths.¹⁷ If the deaths caused by non-tuberculous involvements of the lungs are included, the per cent increases to 31.6. This notation is made as x-ray facilities were not always available during this period and autopsies were not performed except in coroner's cases. There-

fore, a number of patients probably died of tuberculosis but were not so diagnosed.

For the past four and one half years there were 62 deaths from tuberculosis within the institutions, or 13.7 per year with a yearly total census of approximately ten thousand.¹⁷ This is a death rate from tuberculosis of 137 per 100,000. As many were paroled with tuberculosis in serious general condition, it is fair to assume a good share of these also succumbed to this disease. A death rate, therefore, of approximately 200 per 100,000 would be a reasonable estimate. This is nearly *five times greater* than the average death rate for Illinois (See Fig. 9).

Figure 9
TUBERCULOSIS MORTALITY RATE PER 100,000

Illinois	[REDACTED]	41.9
East St. Louis	[REDACTED]	45.9
Chicago	[REDACTED]	55.2
Illinois Penal Institutions, actual	[REDACTED]	137

From October 3, 1939, to June 1, 1944, thirty-one deaths occurred in the Tuberculosis Hospital. They are allocated as follows:

<i>From</i>	<i>10-3-39</i> <i>to</i> <i>6-30-40</i>	<i>7-1-40</i> <i>to</i> <i>6-30-41</i>	<i>7-1-41</i> <i>to</i> <i>6-30-42</i>	<i>7-1-42</i> <i>to</i> <i>6-30-43</i>	<i>7-1-43</i> <i>to</i> <i>6-1-44</i>	<i>Totals</i>
Joliet	1	6	2	3	1	13
Menard	0	5	2	1	1	9
Pontiac	3	3	2	0	1	9
Totals	4	14	6	4	3	31

The deaths are further classified by diagnoses:

Far Advanced Pulmonary Tuberculosis	25
Pulmonary Tuberculosis, Probable	1
Miliary Tuberculosis, Probable	1
Bilateral Pleural Effusion	1
Osteomyelitis	1
Pneumonia and Senility	1
Osteomalacia	1

Of these, 19, or 60 per cent were colored and 12, or 40 per cent were white.

The average length of hospitalization prior to death was 288 days. Classified as to institution from which patients were received: Joliet 202 days, Menard 432 days, Pontiac 106 days.

Census Table:

Deaths in Hospital	31	14.5%
Present Census	43	20.5%
Out-Patient Status (Pontiac Branch)	25	11.5%
Paroled, Discharged and/or Transferred	113	53.5%
Total Patients Admitted	212	100.0%

DISCUSSION

The survey committee of the Institute of Medicine of Chicago, in their report in 1937, stated:

"There are certain factors which make the problem simpler in prisons than it is in civil communities. In the first place, the economic and social factors are completely under control. The housing conditions, the hours of work, the length and type of recreation, the amount of sleep, and the diet can all be precisely regulated. In the second place, definite and effective steps can be taken to find the early case, and isolation and treatment can be strictly enforced. Most of the factors which handicap the work among the population at large are here eliminated."¹⁸

They suggested the following program for the prisons of Illinois:

1. Each incoming prisoner is to have a tuberculin skin test.
2. All who have positive reactions are to have x-rays.
3. Each incoming prisoner is to be questioned concerning family history of tuberculosis, previous attacks of the disease, and a history of pleurisy with effusion and cervical adenitis.
4. All those with positive x-rays are to be sub-classified into two groups: (a) Those with active lesions; (b) those with inactive or suspicious lesions.
5. All those with active lesions are to be sent to the prison tuberculosis hospital for isolation and treatment.
6. All those with inactive or suspicious lesions are to be segregated in a portion of a cellhouse close to the tuberculosis hospital where they can be partially isolated and under the close supervision of the tuberculosis specialist.
7. All those with family histories of tuberculosis or with histories of pleurisy with effusion or glands in the neck are to be kept on record and x-rayed each six months.
8. All those with negative tuberculin tests are to have the test repeated each year. This will be a test of the effectiveness of the program. Unless there are prisoners or employees with active tuberculosis which has been unrecognized, a prisoner who enters with a negative test should remain negative. A high incidence of conversions

in any prison or any portion of a prison should be an indication for an intensive investigation of that sector."

"While the foregoing system would locate the incoming cases of tuberculosis, it would not help in finding those already in the institutions or those which develop after admission. It is certain that there are many such cases and, therefore, an essential part of a tuberculosis program must be an active case-finding system among the prisoners and employees. This could be best started by x-raying everyone."

"At the present time there are less than 100 recognized cases of tuberculosis in all the institutions. Dr. Rector found that the recognized incidence in prisons throughout the country was 1.1 per cent. A conservative estimate of the actual incidence is 2 per cent."

"If this system of case-finding were inaugurated, the only remaining problem would be the early diagnosis of the cases developing during the prison term. These should be few; and a careful follow-up of prisoners with family or past histories of the disease and a liberal use of the x-ray in investigating prisoners with suspicious symptoms should be sufficient."

The survey committee recommended a central tuberculosis hospital at Pontiac for the problems of isolation and treatment and that "the physician in charge of the tuberculosis hospital and the case-finding work in all the prisons should be one with special experience and training in the modern treatment of tuberculosis." They thought: "A constant high standard of work could best be assured were he to be chosen and supervised by the faculty of the medical school of the state university." Regarding surgery of pulmonary tuberculosis, the committee believed: "A consultant should be appointed to do this work who might well be the thoracic surgeon of the state university."

The building of sanatoria or special sections for treating a preventable, communicable disease in a restricted and detained group appears to be folly unless modern means of detecting the pathology in the entire population are repeatedly used.

Over a span of years, it would be more lucrative to employ case-finding methods and isolate active cases even though modern therapy is not available. It would be better to use detection, isolation and treatment.

SUMMARY AND CONCLUSION

Inmates have a right to reasonable medical care and sanitation. Ninety-five per cent of all inmates in Illinois are eventually released.

Tuberculosis is a major health problem in many state penal institutions. There is a national trend toward its recognition and correction. Few states, however, have adequate control programs. There is a need for separate sections or hospitals to treat this disease.

The eradication and treatment should be relatively easy and simple with administrative and medical cooperation.

All personnel (guards, attendants, inmates, etc.) of the Tuberculosis Hospital should be immediately responsible to the executive physician, and indirectly to the lay administrators. The retention and removal of all hospital employees should be at the discretion of the executive physician.

At times, it is necessary to have sputum collections, temperatures, etc., certified.

At least one registered nurse should be on duty during each shift. Inmate personnel need supervision but give good service and are deserving of extra good time.

The planning, preparation and serving of food should be under the guidance of qualified personnel.

More efficient guards would lessen breaches of discipline; therefore, higher ratings for hospital guards should be considered.

Humane methods of enforcing discipline are indicated and successful.

Treatment and public health measures should be the same as in modern non-penal sanatoria.

Special psychotics should be treated in the mental division.

Forty-three per cent of our patients had collapse therapy, and in 38 per cent of these sputa were converted.

Ultra-violet light has been very beneficial in tuberculous adenitis and peritonitis.

Employees and inmates of the penal institutions should be tuberculin tested and positive reactors x-rayed. Thereafter, at least yearly examinations (tuberculin and/or x-ray) should be made.

Parole board decisions are important. If adequate care is pro-



Figure 10: Sketch of Photo-roentgen Unit, bus type, ordered since presentation of paper.

vided, inmates should be treated in prison. If treatment is inadequate, sick parole should be considered. Non-penal hospitalization and/or follow-up care should be a condition of parole.

At the Pontiac Branch, 76 per cent of the inmates and 81 per cent of the officers are positive reactors and the morbidity rate of inmates for tuberculosis is 899 per 100,000. More deaths occurred in referrals from the sick lines than from the tuberculin x-ray group.

In the Illinois State Penitentiaries, the known mortality rate of inmates from tuberculosis is 137 per 100,000; the estimated mortality rate is 200 per 100,000.

Out-patients should be under central medical supervision regardless of the locale of their incarceration.

The Department should use a mobile photo-roentgenographic unit (See Fig. 10), central interpretation of x-rays, and standardize treatments and methods of transferring patients.

There is need for a national committee of physicians to study the problem of tuberculosis in prisons.

RESUMEN Y CONCLUSIÓN

Los reclusos en penitenciarias tienen derecho a recibir atención médica e higiénica razonables. El 95 por ciento de los presos en Illinois obtienen finalmente la libertad.

La tuberculosis es un problema sanitario de mayor importancia en muchas instituciones penales de los Estados. Existe una tendencia nacional hacia el reconocimiento y corrección de este problema; pero pocos Estados cuentan con adecuados programas de control. Se necesitan secciones separadas u hospitales para tratar esta enfermedad.

La erradicación y el tratamiento serían relativamente fáciles y sencillos con la necesaria cooperación administrativa y médica.

Todo el personal del Hospital para Tuberculosos (los guardias, sirvientes, presos, etc.) debe depender directamente del médico ejecutivo, y sólo indirectamente de los administradores legos. La retención y remoción de todos los empleados del hospital debe estar a la discreción del médico ejecutivo.

Es necesario a veces certificar las colecciones de esputo, las temperaturas, etc.

Por lo menos una enfermera graduada debe estar de servicio durante cada turno. Los reclusos empleados necesitan supervigilancia pero dan buen servicio y merecen diversión extra.

El planear, preparar y servir los alimentos debe estar bajo la dirección de un personal competente.

Las infracciones de disciplina disminuirían con guardias más eficientes; por consiguiente, se deben considerar requisitos más rígidos en la selección de guardias para el hospital.

Debe emplearse métodos humanitarios para hacer observar la disciplina, y ellos dan buen éxito.

El tratamiento y las medidas de higiene pública deben ser las mismas que en sanatorios modernos no penales.

Pacientes con psicosis deben ser tratados en la división de enfermedades mentales.

El 43 por ciento de nuestros pacientes recibieron colapsoterapia, y en el 38 por ciento se obtuvo la conversión del esputo.

La luz ultravioleta ha sido muy beneficiosa en adenitis y peritonitis tuberculosas. La radioterapia en la adenitis daría resultados más satisfactorios.

Tanto los empleados de las instituciones penales como los presos deben ser probados con tuberculina, y se debe tomar radiografías de los reactores positivos. Debe repetirse los exámenes (tuberculina y/o radiografía) por lo menos una vez al año.

Las decisiones de la Junta de Libertad Condicional son importantes. Los presos deben ser tratados en la penitenciaria si obtienen allí atención adecuada, pero si el tratamiento es inadecuado debe considerarse darles libertad condicional por enfermedad. Hospitalización en una institución no penal o tratamiento subsecuente, o ambos, deben ser requisitos para obtener la libertad condicional.

En la Sección de Pontiac el 76 por ciento de los presos y el 81 por ciento de los oficiales son reactores positivos, y entre los presos la morbilidad por tuberculosis es del 899 por 100,000. Hubo más defunciones entre los que fueron referidos por sentirse enfermos que en el grupo descubierto por medio de la tuberculina y la radiografía.

En las Penitenciarias del Estado en Illinois la conocida mortalidad por tuberculosis entre los presos es del 137 por 100,000; la mortalidad estimada es del 200 por 100,000.

Los pacientes externos deben estar bajo superintendencia médica central, no importa cual sea el lugar de su encarcelación.

El Departamento debe usar un aparato foto-roentgenográfico móvil, instituir la interpretación central de las radiografías y establecer uniformidad en los tratamientos y en los métodos de trasladar a los pacientes.

Se necesita un comité nacional de médicos para estudiar el problema de la tuberculosis en las penitenciarias.

REFERENCES

- 1 Ransom, J. B.: "Tuberculosis in Penal Institutions," *Document No. 142*, House of Representatives, 58th Congress, 1904.
- 2 Rector, Frank L.: "Health and Medical Service in American Prisons and Reformatories," *The National Society of Penal Information, Inc.*, 1929.
- 3 East, W. Norwood: "Medical Aspects of Crime," Philadelphia, P. Blakiston's Son & Co., 1936.
- 4 McCartney, James L.: "The Medical Profession and Prisons," *J.A.M.A.*, 102: 1700, (May 19) 1939.
- 5 Reports from all States, 1944.
- 6 Personal Communication with Federal Bureau of Prisons, 1944.
- 7 Personal Communication with W. J. Smith, Jr., Superintendent, Division of Supervision of Parolees, Illinois Department of Public Safety, 1944.
- 8 Senate Bill No. 458, Illinois General Assembly, 1943.
- 9 Personal Communication with T. P. Sullivan, Director, Illinois Department of Public Safety, 1944.
- 10 Personal Communication, American Dietetic Association, 1944.
- 11 Personal Communication with Division of Home Economics and Nutrition, Illinois Department of Public Welfare, 1944.
- 12 King, M. R.: "Tuberculosis in Prisons," *American Prison Association, Proceedings*, 67th Annual Congress, 279-87, 1937.
- 13 Palmieri, V. M.: "The Fight Against Tuberculosis In Italian Prisons," *Die Medizinische Welt*, 3: 551, (April 13) 1929.
- 14 Polidori, C.: "Tuberculosis in Penitentiaries and Its Clinical and Social Aspects," *Dijesa Sociale*, 11: 1, (January) 1932.
- 15 Personal Communication with Dominion of Canada, 1944.
- 16 Personal Communication with Dwyer, Frank A., Deputy Commissioner, Department of Correction, Boston, Massachusetts, 1944.
- 17 Personal Communication with Statistical Division, Illinois Department of Public Safety, 1944.
- 18 Report of Committee of the Board of Governors of the Institute of Medicine of Chicago, "Medical Services in the Penal Institutions of the State of Illinois," (June 16) 1937.

Other References:

- Ball, M. V.: "A Record of the Diseases of Five Hundred Sixty Convicts Undergoing Cell Confinement," *J.A.M.A.*, 1393-5 (June 11) 1898.
- Blake, Wyatt Heylin: "The Need of A Separate Prison For Consumptive Convicts," *Transactions of the Medical Association of the State of Alabama*, The Appendix of Medical and Sanitary Dissertations and Reports, 82-5, 1898.
- Osborne, Thomas Matt: "Health Conditions in Prisons," *Proceedings of the Twentieth Annual Convention of the American Nurses Association*, 881-9, 1917.
- Clark, W. A.: "Health Conditions in the Missouri Penitentiary," *J. Missouri M. A.*, 15: 10-14, (Jan.) 1918.
- Jonas, Edgar A.: "Health Survey of the Chicago Bridewell," *The Chicago Medical Recorder*, 46: 152-9, 1924.
- Report of the Joint Legislative Committee on Prisons and Reformatories, appointed by the 86th General Assembly of Ohio: "The Penal Problem in Ohio," 1926.
- Putto, J. A.: "Tuberculosis in Our Penitentiaries According to Penitentiary Statistics," *Tegeu de tuberculose*, 26: 185, 1930.
- Jones, Henry A.: "To the Editor," *J.A.M.A.*, 103: 206, (July 21) 1934.
- Davis, Jerome: Report of the Legislative Commission on Jails, with a special study on the Jail Population of Connecticut, (Dec. 3) 1934.
- Mezey, Cornelius: "High Points of Prison Hospital Administration," *Medical Record*, 142: 10-13, (Oct. 16) 1935.

- Thuesen, A. E.: "Routine Pulmonary Roentgenology in Prison," *Medical Record*, 151: 428, (June 19) 1940.
- Stanley, Leo L., Jr.: "Tuberculosis in San Quentin," *Calif. and Western Med.*, 49: 436-9, (Dec.) 1938.
- Stanley, Leo L., Jr.: "Tuberculosis in San Quentin," *Calif. and Western Med.*, 50: 23-4, (Jan.) 1939.
- Personal Communication with Roy Kegerreis, Roentgenologist, Elmhurst, Illinois, regarding "Inspection of the X-ray Departments of the Illinois Penitentiaries," 1943.
- Bowen, A. L.: "Some Goals of the State Hospital," *The Welfare Bulletin*, Illinois Department of Public Welfare, 1943.
- Personal Communication with Lydia Marshak, Prison Physician, Illinois State Reformatory for Women, 1944.

Tuberculosis in American Colleges and Universities

RUTH E. BOYNTON, M.D.*

Minneapolis, Minnesota

Tuberculosis is recognized as one of the major health problems of the college age student. For years college health authorities have endeavored to find the tuberculous student in order to safeguard the other students in the college community. It has been a common practice in our colleges and universities to require a medical examination at the college on admission. Prior to 1928 or 1929 this examination consisted solely of the usual physical check-up. So far as the detection of tuberculosis was concerned, the examination of the chest with the stethoscope was the method used. A few cases of tuberculosis, usually moderately or far advanced, were detected by this method. Tuberculous students were sent home under the care of their own physicians, and the college felt secure that it was protecting its student body from exposure to this disease. What a false sense of security this was we now realize.

What few early papers are found on the subject of tuberculosis in college students report on the number of students breaking down with tuberculosis during their college careers. Myers¹ at the University of Minnesota, who organized the first chest clinic for college students in 1920, and Ferguson² at Western Reserve University, were among the pioneers reporting in this field. These early reports showed that the common experience was to have a student report to the Student Health Service because of a severe cough of long standing or a frank hemorrhage. The physical examination and x-ray findings, together with sputum examination, would permit a diagnosis of pulmonary tuberculosis, usually in an advanced stage. In other words, in these early days tuberculosis was diagnosed only when it produced symptoms.

Prior to 1931 there was no widespread organized effort to improve this situation. A very few institutions had started to tuberculin test their students and x-ray the reactors. The majority of colleges continued with the usual physical examination, oblivious to the fact that tuberculosis was a serious problem on the college campus, or that they were meeting this problem most inadequately.

In May of 1931 the First National Conference on College Hygiene was held at Syracuse, New York. This Conference was originally

*From the Students' Health Service, University of Minnesota, Minneapolis, Minnesota.

planned by the National Tuberculosis Association and was sponsored by the President's Committee of Fifty on College Hygiene, the American Student Health Association and the National Health Council. The purpose of the Conference was to focus the attention of college authorities on the basic health problems of college students, to secure the expert analyses of these problems, and then to formulate a statement of their conclusions with recommendations to the colleges. The Conference was attended by representatives of colleges and universities from all sections of the country, all of whom were responsible for some phase of health work in their respective institutions. Since this was a working conference, committees were appointed to consider the various phases of the health problems of college students. A Committee on Tuberculosis, under the chairmanship of the late Dr. Lee Ferguson of Western Reserve University, and of which Dr. J. Arthur Myers of the University of Minnesota and President-Elect of this organization, was a member, was one of the important committees of the Conference. This marked the first time in the history of student health work that special consideration was given to the problem of tuberculosis in college students.

This Committee made the recommendation that all colleges and universities include as a part of the physical examination of all students on admission a routine Mantoux tuberculin test and an x-ray of the chest of all tuberculin reactors. In addition, the Committee recommended that a five-year program for the study of tuberculosis in college students be arranged jointly by the National Tuberculosis Association and the American Student Health Association. Both of these organizations were much interested in this suggestion, and the American Student Health Association appointed a special Tuberculosis Committee to consider such a study. A special joint meeting of representatives of the two associations was held in the summer of 1931, and a five-year study of tuberculosis in college students was outlined. It was hoped that money might be obtained from one of the Foundations to carry on the study. However, this did not materialize. It was then suggested that the American Student Health Association, through its Tuberculosis Committee, work with the National Tuberculosis Association in the collection, analysis, and presentation of data on tuberculosis in college students and in the working out of methods for the control of tuberculosis in the colleges. A joint program of tuberculosis control has been carried out on this cooperative basis for the past 13 years. No special funds have been available for this work, but the individual colleges and universities have been stimulated to carry on the program as a part of their general health work. The National Tuberculosis Associa-

tion has given generously of the time of its staff members to aid in the collection and analysis of the data received from the various colleges, as well as in the promotion of the program through its state and local tuberculosis associations. Much of the success of the program has been due to the cooperation of the National Tuberculosis Association with the American Student Health Association.

The Tuberculosis Committee of the American Student Health Association has had three main objectives:

- (1) To formulate a suitable program for tuberculosis control in college students. This was presented to the Association in 1932 and has since been widely distributed. The essentials of this program are routine tuberculin testing and x-ray.
- (2) Through the sectional groups of the American Student Health Association to stimulate interest in tuberculosis and to bring about the adoption of definite programs for its control at all the institutions of higher education.
- (3) To collect statistics on the incidence of tuberculosis and results of tuberculin testing in college students. This was started for the school year 1932-33 and has continued each year since then.

These objectives have been carried out through the presentation of papers on tuberculosis control at the annual meetings of the American Student Health Association as well as at the sectional meetings of that organization. Statistics on the incidence of tuberculosis in college students have been obtained through questionnaires sent annually to the individual colleges and universities throughout the country. During the early years of the Committee these questionnaires were very simple, and the information received was largely as to whether the school was carrying on any special program for the detection of tuberculosis and what the nature of that program was. More recently more detailed information has been obtained about the incidence of tuberculin reactors in the schools and the number of cases of tuberculosis diagnosed each year. In 1942 Dr. C. E. Lyght,³ then chairman of the Tuberculosis Committee, reported on the first ten years of the work of his committee. The data presented to show the progress of the control of tuberculosis in colleges and universities are taken largely from the annual reports of this Committee of the American Student Health Association.⁴

The number of colleges and universities with tuberculosis case-finding programs from 1931 to 1941 is shown in the first table. When the program began in 1931 it was estimated that there were between six and ten institutions of higher education using the tuberculin test as a routine diagnostic procedure. Year by year the number has increased until in 1940-41 there were 255 colleges

TABLE I
*Colleges and Universities with Tuberculosis
Case-Finding — 1931-41*

Year	Number Reporting Tuberculin Testing	Number Reporting Some Tuberculosis Program
1931-32	6-10 (Est.)	
1932-33	12	
1933-34	38	
1934-35	42	
1935-36	28*	
1936-37	91	104
1937-38	116	133
1938-39	143	165
1939-40	213	248
1940-41	255	304

*Incomplete returns.

that reported routine tuberculin testing of their students and a total of 304 colleges reporting some tuberculosis program. In some institutions a routine chest x-ray of each student or a fluoroscopic examination of the chest is used without the tuberculin test.

TABLE II
*Questionnaire Survey of Tuberculosis Case-Finding
in American Colleges and Universities*

Year	Blanks Sent	Replies Received	Tuberculosis Program Reported
1936-37	819	233	104
1937-38	852	238	133
1938-39	857	282	165
1939-40	877	475	248
1940-41	854	483	304
1941-42	860	488	311
1942-43	879	398	267

The increasing interest and cooperation of the colleges in the tuberculosis program is shown in Table II. The number of colleges and universities replying to the questionnaires, as well as those reporting a tuberculosis program, has increased steadily during the past few years. In 1941-42, 488 institutions replied to the questionnaire, and 311 reported a tuberculosis program in progress. This latter figure represents an increase of almost 200 per cent in the last five years and includes about 40 per cent of the nation's colleges. Although the figures for 1942-43 show a slight decrease in the number of schools reporting a tuberculosis program, this, I am certain, may be explained by the depletion of medical staffs due to the war and the necessary curtailment of many phases of college health programs.

TABLE III
Tuberculosis Case-Finding as Reported in Various Classes of Institutions of Higher Education

Type of School	Schools with No Tbc. Program 1940-41	Schools with Some Tbc. Program 1940-41
Private endowed colleges	131	118
Endowed universities	6	35
State or provincial universities	5	36
State colleges and institutes	9	35
State normal and teacher's colleges	22	70
Civic colleges and universities	6	10
Total reporting, 1940-41:	179	304

Tuberculosis case-finding programs, as reported in various types of institutions of higher education, are shown in Table III. Of 483 schools replying to the questionnaire in 1940-41, 179 reported no tuberculosis program, while 304 stated that they were carrying on some types of program. It is interesting that of all types of schools, the private endowed colleges and the civic colleges and universities are the groups having the smallest percentage of schools with a tuberculosis program. It may be true that the incidence of tuberculous infection in students attending such colleges

is lower than that for other schools. Nevertheless such schools are running the risk of admitting an occasional student with tuberculous disease, which seems unnecessary, to say the least.

TABLE IV
Enrollment of Institutions Cooperating in Tuberculosis Survey

<i>Enrollment</i>	<i>Number of Schools</i>	
	<i>1939-40</i>	<i>1940-41</i>
Less than 500 students	175	180
500 to 999 students	129	123
1,000 to 1,999 students	58	71
2,000 to 2,999 students	29	29
3,000 to 3,999 students	17	12
4,000 to 4,999 students	6	7
5,000 students and over	34	34
Enrollment not given or listed	27	27
Total schools	475	483
Total student enrollment (where reported)	680,201	689,783

TABLE V
*Tuberculin Testing of American College Students,
1932 to 1941, inclusive*

<i>Year</i>	<i>Total Number Tested</i>	<i>Per Cent Positive</i>	<i>Per Cent Men Positive</i>	<i>Per Cent Women Positive</i>
1932-33	14,318	35.0	35.0	27.0
1933-34	25,184	30.3	30.0	26.0
1934-35	26,861	29.4	30.0	27.8
1935-36	31,601	30.0	31.0	28.0
1936-37	56,224	27.3	29.4	24.8
1937-38	64,232	25.8	29.8	23.5
1938-39	82,774	25.5	27.0	24.3
1939-40	123,389	25.4	26.5	22.0
1940-41	149,744	20.7	22.8	18.5

Not only do we find various types of institutions of higher education that are cooperating in a tuberculosis survey, but also all sizes of schools. It is encouraging that small schools with a limited enrollment and, in most instances, a limited health service, find it possible to protect their students from tuberculosis as well as the larger institutions with well organized health services.

The reports on tuberculin testing indicate that slightly more than one half of the colleges are using the Purified Protein Derivative, while the remainder use Old Tuberculin for their testing. Although the committee has recommended and urged the two-dose method of tuberculin testing, some colleges still use but one dose. Over 60 per cent report the two-dose method, however.

The results of the tuberculin testing of college students are shown in Table V. The number of college students tuberculin tested has increased from less than 15,000 in 1932 to almost 150,000 in the school year 1940-41. During this same period the percentage

TABLE VI
*Tuberculin Testing of College Students in 104 Colleges
(By States and Various Geographical Areas, 1941-42)*

	No. Tested	No. Positive	Per Cent Positive
Main, New Hampshire, Connecticut, Vermont, Massachusetts, Rhode Island	3,390	1,164	34.3
New York, Pennsylvania, New Jersey, Maryland, Virginia, West Virginia	7,143	2,072	29.0
North Carolina, South Carolina, Georgia, Tennessee, Alabama, Mississippi, Florida	4,208	719	17.1
Ohio, Kentucky, Indiana, Illinois, Michigan, Wisconsin, Missouri, Minnesota, Iowa	37,665	7,230	19.4
North Dakota, South Dakota, Kansas, Idaho, Montana, Utah, Wyoming, Colorado, Nebraska	6,775	1,279	19.0
Arkansas, New Mexico, Louisiana, Oklahoma, Arizona, Texas	5,122	951	18.5
Washington, Oregon, California	8,744	2,542	29.0
TOTAL	73,047	15,957	21.8

of those students reacting to the test has decreased from 35 per cent to 20.7 per cent. This decrease in the number of students infected with tubercle bacilli is encouraging but not surprising in view of the decline in tuberculosis mortality which has occurred during this same period. In the report of the Tuberculosis Committee of the American Student Health Association for 1942-43, Dr. H. D. Lees, of the University of Pennsylvania, the present chairman of the Committee, reports that in 42,000 students tested with what was considered an adequate dosage of tuberculin, positive reactions were obtained in only 18.6 per cent. In 13 colleges of this group, less than 10 per cent of positive reactors were found among their students.

Geographical differences in the incidence of tuberculous infection as shown by the reaction to the tuberculin test are presented in Table VI. These data are based on an adequate dosage of tuberculin. The highest percentage of reactors are found on the east and west coasts, with the middle and northwest and south showing the lowest number.

Proof of the value of the tuberculosis programs in the colleges and universities of this country is shown by the number of cases of active tuberculosis found. It is an accepted fact that clinical tuberculosis can be found if it is looked for. The experiences of the colleges in diagnosing tuberculosis reaffirm this fact.

In Table VII the number of cases of tuberculosis diagnosed in those institutions with an organized tuberculosis program compared with those having no organized tuberculosis program is presented. The questionnaire and report forms sent to the college do not ask that the stage of the disease be specified for the new cases of tuberculosis. Our experience at the University of Minnesota, however, is probably typical of other schools. In our experience, approximately 90 per cent of the clinically active cases of tuberculosis are in the incipient stage. In these early stages symptoms are usually absent, and without the use of the routine tuberculin test and chest x-rays most of these cases would have been undiagnosed at this time.

For the three years for which we have figures there seems to be a decrease in the cases of active tuberculosis occurring in college students. This period is too short to state that this trend is real, although one would expect this with the decreasing percentage of tuberculin reactors. The important observation in Table VII, however, is the difference in the cases of tuberculosis per 100,000 students found in those institutions with an organized tuberculosis program compared with those that have no program. This is so striking that it should convince those responsible for the health program in any institution of the value of a modern, case-finding

TABLE VII
*New Cases of Pulmonary Tuberculosis Diagnosed
 Among College Students*

	1940-41		1941-42		1942-43	
	+	O	+	O	+	O
No. clinically active cases tbc. diagnosed	343	14	259	4	168	2
No. clinically inactive cases tbc. diagnosed	623	19	485	7	354	0
Total number new cases reported	966	33	744	11	522	2
No. students who left college because of tbc.	309	18	240	6	164	5
Number of institutions reporting	304	179	311	177	267	131
Approximate total enrollment	545,000	145,000	558,075	146,000	406,626	90,670
New cases per 100,000 students	177.2	22.7	133.5	7.53	128.3	2.21

+= institutions with some organized tuberculosis program.

O = institutions with no organized tuberculosis program.

program and the inadequacy of attempting to diagnose tuberculosis on a basis of symptoms or ordinary physical findings. Not only is the college protecting itself and its community by this method, but is rendering a real service to the hundreds of students in whom tuberculosis is found in the early stages so that treatment can be obtained with relatively little loss of time.

SUMMARY

Tuberculosis is still one of the important health problems of the college student and is so recognized by more and more colleges and universities. The number of institutions of higher education with tuberculosis case-finding programs has increased from 6 to over 300 in the past 13 years. This increasing interest in the control of tuberculosis in college students is due in large part to the co-

operative efforts of the Tuberculosis Committee of the American Student Health Association and the National Tuberculosis Association.

The incidence of tuberculous infection in college students as shown by the tuberculin reaction has decreased from 35 per cent to approximately 20 per cent since 1931. The highest percentage of reactors was found in schools on the east and west coasts.

As a result of routine case-finding programs in the colleges, between 500 and 900 new cases of tuberculosis have been diagnosed annually during the past three years. In institutions with no organized tuberculosis programs in 1942-43 only 2.21 new cases per 100,000 students were found, compared to 128.3 in those schools making an organized effort to find tuberculosis.

The experience of the colleges in tuberculosis control provides further evidence that tuberculosis can be controlled in institutions by the application of known methods of diagnosis.

RESUMEN

La tuberculosis es todavía uno de los problemas sanitarios más importantes del estudiante de colegios superiores, y cada vez más colegios y universidades lo reconocen así. El número de instituciones de educación superior que cuentan con programas para descubrir casos de tuberculosis ha aumentado de 6 a más de 300 en los últimos 13 años. Este interés creciente en el control de la tuberculosis entre los estudiantes de colegios superiores se debe en gran parte a los esfuerzos cooperativos del Comité de Tuberculosis de la Asociación Americana de Higiene Estudiantil y de la Asociación Nacional de Tuberculosis.

La frecuencia de infección tuberculosa entre los estudiantes de colegios superiores revelada por la reacción a la tuberculina ha disminuido del 35 por ciento a aproximadamente el 20 por ciento desde 1931. Se descubrió el porcentaje más alto de reactores en las escuelas de las costas del Este y del Oeste.

Durante los últimos tres años se ha diagnosticado de 500 a 900 nuevos casos de tuberculosis al año como resultado de los programas sistemáticos de descubrimiento de casos en los colegios superiores. En las instituciones que no tienen planes anti-tuberculosos organizados se descubrieron durante 1942-43 solamente 2.21 casos nuevos por 100,000 estudiantes, comparados con 128.3 en aquellas escuelas que hicieron un esfuerzo organizado para descubrir tuberculosis.

La experiencia de las escuelas superiores en el control de la tuberculosis suministra prueba adicional de que es posible dominar la tuberculosis en instituciones, aplicando los métodos de diagnóstico ya conocidos.

REFERENCES

- 1 Myers, J. A., and Shepard, W. P.: "Tuberculosis and Other Respiratory Infections Among University Students," *Minnesota Medicine*, 8: 237-242, (April) 1925.
 - 2 Ferguson, Lee: "Some Observations on Pulmonary Tuberculosis in Students," *Proceedings of the American Student Health Association*, Bulletin 13, 1929. Pp. 43-64.
 - 3 Lyght, C. E.: "Tuberculosis in College Students," *American Review of Tuberculosis*, 46: 227-237, (Sept.) 1942.
 - 4 Proceedings of the American Student Health Association, 1931-1941.
-

The Care of the Tuberculous Veteran*

COLONEL ROY A. WOLFORD, M.C., F.C.C.P.**

Washington, D. C.

With the enactment of legislation, October 6, 1917, the Federal Government recognized a responsibility for the continued hospital care and medical treatment of soldiers and sailors of the World War after their discharge from the Army and the Navy for service-incurred injury or disease.

The Sweet Bill, approved August 9, 1921, created the Veterans Bureau and charged the new agency with full authority and responsibility for all activities, including hospital care, relating to discharged veterans of the World War.

On May 1, 1922 there were transferred to the Veterans Bureau by Executive Order, all of the Veterans hospitals being operated by the United States Public Health Service. Among the institutions transferred were twelve tuberculosis hospitals, aggregating 7,168 beds. At the time of this transfer of hospitals there were ninety-five Government institutions in operation in which ex-service beneficiaries of all classifications, i.e., general medical and surgical, tuberculosis, and neuropsychiatric, were being hospitalized. In addition, it was necessary to utilize 761 civil hospitals.

The 44,591 tuberculous patients hospitalized during that year aggregated 26 per cent of all veterans treated during the twelve months' period and represented the peak annual load for this class of beneficiary. Of the approximately 10,789 tuberculous beneficiaries remaining in hospitals on the last day of June 1922, less than one-half were being cared for in Veterans hospitals; about one-third were being treated in contract hospitals and over one-sixth were hospitalized in Government hospitals, not directly under the administration of the then United States Veterans Bureau, but being operated by the Army, Navy, United States Public Health Service and the National Soldiers' Homes. Of all beneficiaries remaining in hospitals at the end of the fiscal year 1922, 43 per cent were suffering with tuberculosis.

At this period, all patients under treatment were hospitalized for service-connected disabilities. For the tuberculous beneficiaries discharged for all reasons during 1922, the average hospital stay

*Published with permission of the Medical Director, Veterans' Administration, who assumes no responsibility for the opinions expressed or conclusions drawn by the author.

**Assistant Medical Director, Veterans' Administration.

was approximately seventy-six days. Over 26 per cent during that year had left the hospital through irregular discharge, that is, without the consent of the physician.

Benefits of hospitalization were extended to veterans suffering with non-service-connected tuberculosis, through an Act of June 7, 1924, approximately five and one-half years after the armistice.

While the number of cases on the compensation rolls whose major disability was tuberculosis, increased to a peak of 63,932 by the year 1933, there was a gradual decrease in the hospital load by 1934, when but 13,615 were hospitalized during the twelve months' period ending June 30th of that year.

An analysis of the principal causes of death of World War Veterans who had succumbed as a result of service and whose dependents were receiving benefits on June 30, 1933 indicated that, during the decade and a half, thirty per cent had died from tuberculosis. Considering the deaths by age group, tuberculosis had taken its heaviest toll in the group twenty to forty-nine years.

At the close of the fiscal year 1941, just prior to Pearl Harbor, the tuberculosis hospital load of the Veterans Administration was the lowest experienced. Approximately 14,681 tuberculous cases were under treatment during the twelve months' period. The tuberculosis disability of about 83 per cent of the patients was not service-connected. On June 30, 1941 there were 4,637 veterans remaining in all hospitals under treatment for tuberculosis. This represented 8 per cent of the total hospital load for all types of disability, and was a marked reduction in the percentage of tuberculous patients since June 30, 1922, when 10,789 or 43 per cent of the patients remaining in the hospital were classed as tuberculous.

During the fiscal year 1941 the average length of stay for a tuberculous patient was 188 days. Almost 90 per cent of the veterans remaining in the hospital on June 30, 1941 were beneficiaries of the first World War; peacetime veterans constituting the next larger group, or 8 per cent.

Over 15 per cent, or 53,859 of the total World War compensation service-connected active disability awards on the rolls June 30, 1941, were for tuberculosis as the major disability. Approximately 85 per cent of these awards for service-connected tuberculosis were being paid for arrested tuberculosis.

In addition, 10,135 World War I veterans were receiving pension for non-service-connected tuberculosis. Nor does this represent all of the tuberculous non-service-connected veterans in 1941, but only those whose extent of pulmonary involvement was such as to merit the adjudication of their disability as permanent and total. A veteran with a non-service-connected tuberculosis of less extent

has no entitlement to pension. As of June 30, 1941, death claims had been paid to the widows and dependents of approximately 48,330 deceased tuberculous World War veterans.

An eminent public health administrator once stated that probably the most valuable achievement of a well-conducted tuberculosis hospital in the institutional treatment of tuberculosis was the prevention of infections to the general public. He indicated the most important point in connection with the length of stay in tuberculosis hospitals is the material reduction in the general tuberculosis death rate which is effected by removing patients with active disease from their homes, thus eliminating them as sources of exposure to members of their household. If we consider this benefit, the 327,970 admissions of tuberculous patients during the twenty-two year period from 1921 to 1942 inclusive, for an average hospital stay of 185 days for each patient in our Veterans Administration Facilities, have contributed in good measure to the substantial reduction in the general tuberculosis death rate of the United States for the last two decades.

An analysis of certain statistical data and an outline of some of the factors which have influenced the tuberculosis problem of the Veterans Administration as an aftermath of the first World War, have been presented with the thought that it may afford a better understanding of the magnitude of the task which the Government must be prepared to undertake in the care of the tuberculous beneficiaries of the present world conflict.

The war-disabled promise to be more numerous as an aftermath of this war, perhaps as much as three times the number we began to serve in 1919.

There should be no unnecessary delay between the demobilization of the disabled veteran and his social and economic adjustment to the community. If further hospital treatment is indicated after discharge from the armed forces it should be made promptly available and effectively applied. With this objective in mind, the Veterans Administration has perfected arrangements with the Army, the Navy and the Coast Guard to accept for direct admission to our facilities, coincident with separation from the service, all disabled soldiers, sailors and coast guardsmen requiring further hospitalization, who are being discharged from the armed forces for disability, irrespective of the service or non-service incurrence of the disablement.

This procedure of admission of World War II tuberculous veterans, to our hospitals by direct transfer from the Service hospitals, has distinct advantages in the treatment of these individuals. These may be stated briefly, as follows: (1) a majority of the tuberculous beneficiaries remain in the hospital until treatment

is completed; (2) of those leaving against medical advice or absent without official permission, many are retained for a sufficient period of time to permit instruction in how to conduct themselves in their association with relatives and friends so as not to endanger the health of such contacts. An opportunity has been afforded to teach the tuberculous veterans to know their disease and the benefits to be derived from proper treatment, and (3) to the minority who leave our facilities by irregular discharges during the first few days after being admitted, the Federal Government has conscientiously discharged its heavy responsibility of providing adequate sanatorium care even though the beneficiary for personal reasons subsequently declines the treatment offered.

It was a cause for deep concern in the early days of the present war period when it was observed that the younger World War II veterans being admitted to our hospitals were showing the same restlessness on release from the armed forces manifested by the high percentage of discharges against the advice of the physician, or leaving without permission, as was similarly evidenced by the veterans of the prior World War in the first few years following that conflict.

In those States where the public health and welfare agencies are well organized and there is active cooperation between the Veterans Administration Facilities and these agencies, the problem of tuberculous veterans who interrupt their treatment while still communicable does not loom large.

In some areas the tuberculous veterans living at home are considered by the local public health authorities as the sole responsibility of the Veterans Administration, but actually, the control of the Veterans Administration over these veterans ceases when they leave our hospitals. However, whether suffering with a service-connected or non-service-connected tuberculosis, they are citizens of the community in which they live and the public health resources available to other tuberculous individuals in that community should likewise be extended to the veterans, and their families. Similarly, regulatory procedures commonly invoked in the cases of other infectious individuals should be applied with equal force to veterans whose tuberculous disease is of a character to constitute a public health menace.

Irregular discharges among veterans of World War II have now stabilized to the point where of all such tuberculous beneficiaries admitted to our hospitals, less than 32 per cent leave against medical advice or without the consent of the medical authorities. Of the approximately 7,200 admissions by March 30, 1944 of this group of younger veterans, over 13 per cent were readmissions and about 7 per cent were admissions by transfer from other hos-

pitals. Thus, the 7,200 admissions constituted approximately 5,760 individual veterans and of this number 2,436, or over 42 per cent were remaining under treatment.

CONCLUSION

The control of tuberculous veterans, their education to continued treatment and their ultimate rehabilitation will be just as effective, and not one jot more or less in the individual State, city or county as is the control, education and rehabilitation of other tuberculous individuals in that specific geographical area.

A campaign among medical and industrial circles as to the adaptation of tuberculous individuals in the early arrested stage of the disease to Government service and industry in general, should prove productive in the placement of many of them, both veterans and non-veterans.

A program which has for its objectives, firstly, universal public health control measures; secondly, the general extension of treatment facilities; and finally the establishment of workable rehabilitation projects, is required. It must be so planned that it will merit the effective support of the public as a whole, and administered in a manner that will assure it reaching all elements of the population.

CONCLUSION

El control de los veteranos tuberculosos, su educación para que perseveren en el tratamiento y su rehabilitación final serán tan eficaces, y ni un punto más ni menos, en cada Estado, ciudad o Condado, como lo sean el control, la educación y la rehabilitación de los otros individuos tuberculosos en la misma zona geográfica.

La campaña iniciada por círculos médicos e industriales para adaptar a individuos tuberculosos, en el periodo estacionado temprano de la enfermedad, a empleos en el Gobierno y la industria en general, debe resultar en la colocación de muchos de ellos, tanto veteranos como no veteranos.

Se necesita un plan que tenga por objeto: primero, medidas de salubridad pública de control universal; segundo, la extensión general de facilidades para el tratamiento; y, finalmente, el establecimiento de proyectos practicables de rehabilitación. Debe ser organizado en tal forma que merezca el apoyo efectivo de todo el público, y administrado de tal manera que esté seguro de alcanzar a todos los elementos de la población.

Socio-Economic Problems in the Rehabilitation of the Tuberculous*

EDWARD HOCHHAUSER**

New York, New York

In the post sanatorium phase of tuberculosis work we are interested in retaining the gains made at the sanatorium; the patient's readjustment to the family and the community, and if possible, the return, as early as his physical condition permits, to gainful employment.

The longer the period of hospitalization and the more extensive the disease, the more difficult the readjustment. The socio-economic factors are important in the rehabilitation of patients with a reactivating disease like tuberculosis. Sir William Osler said, "Tuberculosis is a social problem with a medical aspect."

Tuberculosis is a threat to the stability of the family. Long drawn out illness, often of the wage earner, has been a severe drain on the family resources. The National Health Survey disclosed nine times as much tuberculosis in the welfare group as those with an income of \$3000 per year and over; four times as much for those in the income group of less than \$1000 as those with \$3000 or over.

To care for the patient in an institution, provide medical follow-up after discharge, and then have him live in an unsanitary or overcrowded home with insufficient income, is to invite relapse.

If we were discussing treatment, we might point out how important the social factors are in helping the patient get the most out of his cure; for with tuberculosis, a chronic, relapsing disease, we are dealing with a very complex situation in which medicine is interwoven with sociology, economics and psychology.

The man or women with tuberculosis must be considered as,

1. A sick person to be restored to health;
2. A member of a family, sharing the family's problems and limitations;
3. A potential worker, to be restored, insofar as is possible, to his place in the community.

These aspects are not mutually exclusive but rather interdependent.

The man with tuberculosis is not only a patient in whose body

*Read at Annual Conference, New York Tuberculosis and Health Association, February 7, 1945.

**Committee for the Care of the Jewish Tuberculous, Inc.

a disease process is at work. He is a person who reaches for life and health. He is not only an individual, but a member of a family, and that family is part of the community. From his standpoint and that of the community, his tuberculosis is not "cured" until he and his family have been able to wipe out, insofar as it is possible, the whole vicious circle of sickness, fear and insecurity.

"There appeared in a newspaper recently a cartoon of a little boy and his mother on the way to the kindergarten, and the little boy was protesting loudly, 'I don't want to go to the kindergarten, I want to be indoctrinated. I want to be rehabilitated. I want to be retrained.'" This is from an address last December by General Frank T. Hines of the Veterans Administration. He expressed his sympathy for the mother. He spoke of maintaining our normal social institutions. "When peace comes we shall want to stop indoctrination and when retraining is accomplished, we shall want to drop that too in favor of normal social processes."

He discussed the part that social agencies can play in supplementing governmental service. "For one thing, the government deals with the veterans very largely as an individual. But the veteran is not an individual—in any exact or exclusive sense. He is a member of a family, a member of a community, a citizen of the state, a member of civic and religious organizations. He has personal relationships as a husband, father or friend. In other words, he is a part of an all-embracing social life."

The British Information Services Bulletin on Rehabilitation states that the Tomlinson Committee on Rehabilitation and Resettlement of Disabled Persons adopted the view that rehabilitation of a disabled person is not merely a medical problem, but also a social and an industrial problem. In addition therefore to advocating rehabilitation in the medical sense, it advocates special measures:

1. To bridge the gap between discharge from hospital and readiness for full time activity in employment, and
2. To overcome prejudice against the employment of disabled persons."

The English Disabled Persons Act of March 1944, covering both civilian and war disabled makes compulsory the employment of the handicapped. There is a provision for quotas to be decided after consultation between workers and employers organizations.

It calls for "special facilities for the minority whose disablement prevents them permanently, or for a substantial period from entering ordinary employment. This may be through non-profit companies or associations supplying suitable services to whom financial grants could be made."

With a reactivating disease like tuberculosis the effectiveness of

treatment may be measured in years of useful, productive life. Have we made as much progress in preserving the improved status as we have in our treatment of the disease? How many institutions know what happens to their patients the first five years following treatment?

We have been told that if the patient maintains the arrest of his disease for the five years following discharge, the chance of a relapse within the following five years is less than 4 per cent; that the danger of reactivation is greatest in the first and second year after treatment.

The Lancashire County Council (England) in a study of 4231 cases inactive for five years, and subsequently followed up, reported the number of recovered cases restored to the dispensary registry because of renewed activity was 3.8 per cent. In a series of 2488 similar cases the London County Council reported the number of cases restored to the registry was 3.9 per cent. Medical and often social care, is necessary during these years if the gains made at the sanatorium are to be retained.

The provisions for post sanatorium care have not kept pace with institutional care. "As compared with pre-sanatorium statistics, no evidence can be produced to show that the sanatorium regime by itself has increased the expectation of life. On the other hand, there is statistical evidence that the social and home conditions of the tuberculous patient and his earnings and work after discharge, noticeably influence the expectation of life. The absence of after care arrangements almost nullifies any result obtained by treatment." This is from the chapter on tuberculosis in "*The Rehabilitation of the War Injured*," published in 1943.

Dr. James Maxwell, in his chapter, "*The Return to Freedom*" (discussing period after discharge from sanatorium) says, "It cannot be too strongly emphasized that permission to live a normal life although modified in certain directions, still is not a final guarantee that the disease is arrested and that there can be no more trouble."

"The return to a normal working life should preferably be gradual—nutrition must be well kept and therefore stress must be laid upon the importance of three good meals a day. Travel to and from work often requires consideration. On the other hand, there is the danger that if the patient allows the fact of his illness to dwell too much in his mind, he may develop into a hypochondriac."

For many patients there is a real gap between the protected environment of the sanatorium and the impact of every day life as part of the family and the community. The fundamentals of treatment call for long periods of complete rest, slight exercise,

and in institutions with well regulated in-service training programs, part time planned activity. Rest is part of the regimen in which self-interest, the avoidance of conflicts and family responsibilities are always stressed as essential to successful treatment.

At home he faces the realities of every day living with all its normal physical and emotional strains. He may feel it his responsibility to again become the head of the family.

The psychiatrists tell us that most of the difficulties in social adjustment can be traced back to early experience in the home. Yet in the family we have the relationships that should make for a normal mental life. The epidemiologists tell us that many of our new cases of tuberculosis can be traced back to infection in the home. Yet a home with the normal family life provides the elements that aid in continuing the cure and in the physical and mental rehabilitation of the tuberculous.

The psychological problems in the adjustment of the patient to his family and to the community, often call for guidance, if not treatment, by the psychiatrist. While we may disagree with those who state that 90 to 100 per cent of the tuberculous require psychiatric aid, the experience in being found tuberculous, long separation from the family and the community, the very nature of the treatment in an institution, usually isolated and some distance from home, the fear of a relapse and the return to home, all are a threat to stability. Currently we are hearing a great deal about the war disabled and the importance of the acceptance of the handicapped man by the family and the community. How much more important this is with the tuberculous who still meet with an exaggerated fear of infection, plus other emotional insecurities.

We can appreciate how important it is for the family to know something about the treatment and, on discharge from the sanatorium, the patient's limitations, as well as his capacity, but it is equally important that they be given some understanding of the psychological changes.

Fear of tuberculosis may be but the outward expression of the conflict between the patient and his wife; that may be deep seated and antedate the diagnosis of disease; that perhaps has existed only in the subconscious.

We have found the psychiatrist of great help in treatment, but equally in guiding the case worker in dealing with these conflicts. Often this calls for an immoderate expenditure of time, but if successful, may be very crucial in weathering emotional disturbances that threaten the physical well being of the patient.

We have heard psychiatrists say of a patient that his relapse was but an escape from a situation he could not face.

In the early thirties a number of our Altro graduates who lost

their jobs were again compelled to apply for charitable assistance. Conditions that gave others heartaches or headaches gave them chest aches. Insecurity is a mental and physical threat to the patient and his family. The family may exert destructive influence on the patient because of emotional conflicts which arise out of his prolonged disability. The strain of long periods of dependency, added to the fear of infection, often result in social difficulties.

After sanatorium treatment the social aspects become increasingly important in their effect on the ultimate physical and industrial rehabilitation of the patient. There is a conflict between all the elements of cure—the instruction which stresses self-preservation, the need for freedom from avoidable worry, the need for mental and physical rest, and the requirements and conflicts of every day life.

To ignore the social and economic factors and all the family relationships, is to invite a relapse as surely as to have a patient with limited or uncertain work tolerance go directly from treatment in a sanatorium to full time work in industry.

Our conception of family care includes medical supervision of the patient and family, education, direction and where necessary, industrial convalescence as well as such financial assistance as may be necessary.

As in other forms of health work, the amount of money we spend may determine the effectiveness of our work. A thorough going scheme of care that carries the patient through the institution and continues during the trying years that follow, is expensive. But it is much less expensive than a program which is incomplete. Experience has taught us that tuberculosis is a long drawn out disease, costly in treatment and requiring a long period of rehabilitation. Dr. Detweiler, many years ago, said that the care of the tuberculous was a matter of character and pocketbook.

Dr. Harley Williams in "Tuberculosis in Wartime in England" in the January 1945 American Review of Tuberculosis says:

"Financial allowances recommended by Lord Davison's Special Committee, are now paid by the health authorities to all tuberculous patients who have a prospect of returning to work after treatment. These financial allowances are made on the recommendation of the tuberculosis officer after a careful assessment of the patient's clinical condition, and are in the first instance for six months but can be renewed for further periods. The only condition is that the patient must be prepared to carry out the tuberculosis officer's advice on treatment. There is no 'means test' for the standard allowance. The patient receiving these allowances is now able to carry on his cure with the minimum of worry on account of family responsibilities."

"Although the clinical methods of treating tuberculosis have improved so much during the last twenty years, more progress has still to be made in bringing the patient back into a mode of living which suits the state of his health. This process of gradual readjustment we call rehabilitation. Tuberculosis is a slow, chronic disease. It impairs will power more than most diseases, it may produce the chronic invalid who is a drain on his family and the community and often a danger to others."

In Diseases of the Chest, March 1944, Dr. H. I. Spector says, "Looking back into the history of the problem, one discovers that official agencies have constantly underestimated the significance of rehabilitation, and even today comparatively few public health officials recognize its importance. Thousands of dollars are spent annually to allay symptoms and to check progress of the disease, yet the importance of appropriating funds for the purpose of safeguarding patients from relapse after discharge from the sanatorium is not appreciated.

"The great number of relapses and the many deaths which occur within a relatively short time after discharge from the sanatorium, make one wonder whether much of the good work of the sanatoria and a considerable amount of public funds are not being wasted."

Dr. Fred H. Heise, President of the National Tuberculosis Association, concerned with this problem in their January 1945 bulletin said, "The people should be taught the necessity of isolation in a sanatorium and desirability of sanatorium care, and shown the need for continued care long after recovery has apparently taken place. To aid in maintaining the recovered health, living must be subsidized in many instances, patients re-educated in another trade or profession or kept on only part time work. The economic advantages of rehabilitation over care following repeated relapses must be pointed out.

"Regarding perhaps our weakest effort so far, we must show and teach that protection of the recovery from active tuberculosis is financially and socially well worthwhile. We must teach with renewed and strengthened energy, the need of maintaining adequate living standards and the economic advantages of rehabilitation."

Continuity in social care is as desirable as in medical care. Gaps in treatment or transfer from one institution to another with no regard to history or experience, are to be deplored in the social care of the tuberculous as in the medical care. We know well the dilemma of the patient who is given conflicting advice by physicians. It is equally serious and confusing if he finds social agencies failing to cooperate in a plan for his aftercare and rehabilitation.

Medical institutions find it desirable to avail themselves of previous histories, often asking for x-rays as well as reports. To what extent do we in the social care of the tuberculous make our experience available to others or try to develop a common plan where more than one agency is serving the patient at the same time?

The rehabilitation services have recognized the importance of the many social factors that affect the vocational training of the handicapped. In many states the State Rehabilitation Services have a social worker as a member of their staff. Often it is impossible for this social worker to meet the varied needs of the patient or the family. She can take advantage of existing agencies to meet the needs, and where necessary, to supplement the limited financial assistance permitted by law.

This cooperative effort will be equally important in the rehabilitation of the tuberculous veteran even though his disability be war connected. Financial assistance to meet the needs of the patient and his family are very important, and with many, pensions will meet these needs. In some instances the pensions will be inadequate and will have to be subsidized. Pensions can also be a threat, for a scheme of pensions or disability allowance that is not tied up with treatment, rehabilitation and employment, is not sound and puts a premium on invalidism.

Mrs. Helen Lee Gilbert, President, American Legion Auxiliary, said, "If there are influences that impel patients to leave hospitalization before discharge they must be overcome. Whatever decision is arrived at it must be confessed that money withheld has its influences."

We recognize the dangers involved in changing the pension laws, but believe that if it pays the patient to stay at a hospital until maximum medical improvement is attained, and on discharge there is an incentive for rehabilitation, we will have a much better experience than with the tuberculous of World War I. With some patients a scheme for withholding is not only justified but probably necessary. A program of education that stresses ethical motives, the desire to help oneself, will be sufficient with a very large number of the tuberculous veterans. Such education, as all rehabilitation, should start at the time of diagnosis.

We know the temptation to nourish a handicap when it is not to his financial interest to be rehabilitated. At the Altro Work Shop we have had experience with patients having disability insurance clauses in their policies preferring an assured \$125 a month and even less, as disabled, to the uncertainty of earnings after rehabilitation.

Much depends upon the patient himself. Some of the veteran

organizations are aware of this problem, as is the Veterans Administration itself.

The Administrator for the Veterans Administration has publicly expressed his desire to use existing private, as well as public agencies. He said, "Often when the government provides programs for the veterans, the purposes of these programs are thwarted by factors in the social situation. For instance, a veteran pursuing a course of rehabilitation or retraining may give divided attention to his work because of difficulties at home. There are important areas in a veteran's life where a government agency would be almost impotent. These areas are the province of social agencies."

The Assistant Administrator and heads of the medical and rehabilitation divisions with whom I have spoken have more than indicated their desire for this cooperation.

Dr. Kayne in "Rehabilitation of War Injured," discussing patients who present medical and social problems, says, "Three main groups we have to cater to are:

1. Those quiescent patients who need periods of industrial convalescence—that is, work under good hygienic and physical conditions and medical supervision so that arrest of the lesion can be established by the end of that period, and they can then be safely allowed to go back to ordinary industrial conditions.
2. The group of "good chronics" who need employment under sheltered conditions for the rest of their lives—that is substandard workers.
3. The group of "bad chronics" who under suitable conditions can do some work for a number of years.

Therefore the problem is to provide temporary sheltered employment and to provide permanent sheltered employment."

Mr. Michael J. Shortley, Director, Office of Vocational Rehabilitation, Federal Security Agency, in a communication to State Directors and Supervisors of Vocational Rehabilitation, dated December 6, 1944, said:

"Although in the past 23 years we have seen marked growth and advancement in the rehabilitation of the disabled, there has not been a corresponding increase in the program of services for the severely handicapped. Many private organizations throughout the country have been engaged in a variety of programs in an effort to contribute to the economic welfare of the disabled. You will agree, I am sure, that the time has come for a special program of services to the severely handicapped in terms of their needs and the facilities which should be established or improved in the United States."

There is an increasing concern with the so-called severely handi-

capped who are often by-passed in our rehabilitation services. In the tuberculosis field this would include the good chronics who usually have had years of hospitalization and treatment.

They can be found in almost every institution as well as at home. Some may require sheltered employment for the rest of their lives, but can become partially or fully self-supporting. Many such patients maintain their clinical status for years after leaving the sanatorium or go on to a complete arrest of their disease.

These patients present a greater hazard in that the relapse rate will be higher than in a more select group, but economically and socially they offer the greatest return. Instead of being prematurely condemned to the scrap heap they may enjoy many productive, useful years. There is an added public health responsibility on the part of the "good chronics" and the agency providing supervision.

A bill introduced in Congress January 3, 1945 would "provide grants to the states for assistance in the rehabilitation of disabled persons incapacitated for normal employment." This bill is "for the purpose of enabling each state to extend its service of vocational rehabilitation to disabled persons who may be made partially or wholly self-supporting through vocational training in a sheltered work project and to provide permanent employment for disabled persons who can be made partially or wholly self-supporting through sheltered facilities."

I would like to conclude my remarks with a quotation I have used before. It is from John Galsworthy's "Rehabilitation":

"Restoration is at least as much a matter of spirit as of body, and must have as its central truth, body and spirit are inextricably conjoined. To heal the one without the other is impossible.

"A niche of usefulness and self respect exists for every man however handicapped, but that niche must be found for him. To carry the process of restoration to a point short of this is to leave the cathedral without a spire. To restore him, and with him the future of our countries, that is the sacred work."

"Information Please in Medicine"*

Edward P. Eglee, M.D., F.C.C.P., Moderator
New York, New York

MEDICINE

H. Corwin Hinshaw, M.D.
Rochester, Minnesota

PATHOLOGY

Esmond R. Long, Col., M.C.
Washington, D. C.

ROENTGENOLOGY

James T. Case, M.D.
Chicago, Illinois

SURGERY

Evarts A. Graham, M.D., F.C.C.P.
St. Louis, Missouri

CARDIOLOGY

Louis N. Katz, M.D.
Chicago, Illinois

BRONCHOSCOPY

Chevalier L. Jackson, M.D., F.C.C.P.
Philadelphia, Pennsylvania

INTRODUCTORY REMARKS

The American College of Chest Physicians has again brought together a group of outstanding physicians, each a recognized expert in his specialty. These physicians will attempt to answer the questions which you have submitted. This program is unrehearsed and it will be patterned after the "Information Please in Medicine" program which the College presented at New York City in 1940; at Cleveland in 1941 and Atlantic City in 1942.

The first question is directed to Dr. Hinshaw:

Question: What are the results in the use of Penicillin in Pulmonary Suppurations?

Answer (Dr. Hinshaw): Theoretically penicillin has a great advantage over the sulfonamides because of the fact that it is active in the presence of necrotic material. I know of no one who has employed penicillin in the treatment of a large series of cases of pulmonary suppurative disease, but reports should appear soon. Certainly, the question of the results in lung abscess would be difficult to determine because of the fact that 25 per cent of lung abscesses may resolve spontaneously without treatment. However, in some cases a temporary dramatic response to penicillin therapy has been exhibited. In no instance have we felt that the patient has been permanently cured of chronic lung abscess by penicillin. Empyema apparently is not included in the question. In cases of empyema, however, the results apparently are superior. Reports have appeared in the literature to indicate that introducing penicillin intrapleurally early in the course of empyema has successfully eliminated infection and permitted expansion of the lung in a number of instances.

Question: What therapy do you recommend for a symptomless large cyst of one lung in a child 4 months of age?

Answer (Dr. Graham): I regard congenital cysts of the lung as being

*Presented at the Tenth Annual Meeting, American College of Chest Physicians, Chicago, Illinois, June 10, 1944.

very dangerous. As a general rule, therefore, I think they should be removed. In my experience these cysts are very likely to become infected and when this complication has occurred nothing will cure the condition except radical removal. There is also always a danger of rupture of the cyst with a spontaneous pneumothorax which may be fatal. It is a very striking fact that one rarely sees evidence of congenital cysts after middle age. In my opinion the reason is that most patients who have this condition die before they reach middle age. That is another good reason for early radical removal.

Whether or not one should recommend the radical removal of a cyst in a baby four months old is a difficult question to answer. I think that usually it is better to wait until the child is over one year of age to perform this operation. If, however, there have already been any serious symptoms it might be desirable to operate on the baby at this early age. The danger of the effects of a spontaneous pneumothorax from the rupture of a cyst can be greatly diminished by obliterating the pleural space. This can usually be done in a very simple manner by the injection of a few cc. of the patient's blood into the pleural cavity. In the case of a baby of four months of age probably 2cc. of blood would be sufficient.

Question: The group from Mexico is interested in your opinion upon B.C.G. This procedure being in use for several years in South America and Cuba, and about to be used in Mexico for prevention of tuberculosis.

Answer (Col. Long): An experiment under the joint auspices of the United States Indian Service and the Henry Phipps Institute is in progress. Thirty-five hundred Indian children are included in the study, about equally divided between vaccinated and controls. The study is to run a number of years before definite conclusions as to the success of the method are drawn. At the end of the first five year period there were several times as many cases of tuberculosis in the unvaccinated as in the vaccinated children. On the whole the results are definitely encouraging.

Question: What are the differentiative features in the Electrocardiogram in Pulmonary Infarct and Coronary Thrombosis?

Answer (Dr. Katz): This is a pertinent question since pulmonary infarcts are more common than realized, and chest physicians should be aware of this whenever they encounter lung pathology. While pulmonary infarction occurs most often post-operatively, it is more common than generally realized at other times because of the frequency of deep vein thrombosis in the legs. In many instances the clinical episode encountered may be difficult to differentiate from a recent myocardial infarct, which is erroneously called coronary thrombosis. In ninety per cent of instances of pulmonary infarction the electrocardiogram is not characteristic and shows instability in successive records. When the pulmonary lesion is more serious and leads to acute cor pulmonale, the electrocardiogram has some of the earmarks seen in posterior wall infarction of the heart. It differs from it in several regards, however. An S wave appears in leads 1 and 2, changes unusual in posterior wall infarction. S-T in these leads is depressed and slopes up to the T wave like a New England staircase; whence, McGinnis and White of Boston have called it the "staircase" S-T.

S-T depressions of this sort are unusual in posterior wall infarcts. S-T in lead 3 is not elevated, but a Q wave and an inverted T wave are present. One is impressed by the fact that in pulmonary infarct the S-T deviation is marked in 1 and 2 and absent in 3, whereas in posterior wall infarct the S-T deviation is most marked in lead 3; furthermore, in posterior wall infarct lead 2 tends to resemble lead 3 and not lead 1. The "full blown" contour just described is not as often encountered as some of its characteristics, the commonest change being the presence of a $Q_3 T_3$. Often an intraventricular block may be temporarily present with the QRS prolonged to 0.12 second or more, and S_1 , broad and prominent. Ectopic rhythms are more common than in posterior wall infarcts. The chest leads show certain characteristics in pulmonary infarction not seen in myocardial infarcts. CF_5^5 resembles lead 1 and sometimes this is true also of CF_4^4 ; however, CF_2^5 , unlike myocardial infarction of the posterior wall, shows an inverted T. This T inversion together with the limb lead changes make the differential diagnosis.

Far more important than the characteristics in a single record is the evolution of successive records. In infarction of the myocardium, a definite sequence lasting for three weeks to several months is found, whereas changes in pulmonary infarction are fleeting, lasting a day or two, or rarely for a week at most. The marked evolution of the waxing and waning T wave seen in infarcts of the myocardium are absent in infarcts of the lung.

No problem in differentiation is encountered between anterior wall infarcts and pulmonary infarcts.

In conclusion it seems to me that awareness of the possibility of pulmonary infarction and the tendency not to call every coronary-like electrocardiogram a recent myocardial infarction will permit the clinician to avoid the snares of diagnosis.

Question: Evaluate the different types of X-ray Films of Chest—Paper, 14 x 17 Negatives, Micro-Films, 5 x 6-35 mm.

Answer (Dr. Case): That is a question which has interested me for some time. You will all understand that in answering I am giving you my personal opinion. I have had a large experience with the paper film, and considerable, though less, experience with the photoroentgenographic films. Some of my colleagues and I have made experiments with 35 mm. and with 4 by 5 inch films and with 14 by 17 inch paper films, and with the usual 14 by 17 inch celluloid films. Some of these cases had lesions which could not be missed by 14 by 17 inch films but were shown just as clearly or 98 per cent as clearly in the paper films. I could see them on the 4 by 5 inch films with some difficulty, and on the 35 mm. they could easily have been missed. I also have seen a great many patients who have been turned down by various Army and Navy examining boards at induction stations on examinations with the 35 mm. and the 4 by 5 inch films, where the medical opinion given was based upon film interpretation. These patients have been sent to me for stereoscopic 14 by 17 inch film studies to learn the conditions present. Of course, many of them were cases of disabling pulmonary pathology, but others in my opinion should have been accepted. There were no lesions there, so far as I could see.

The paper film has to be read differently than celluloid films of any size. In a manner of speaking, paper films should not be looked

through, but at; it is hard to get used to looking at them. I still find myself trying to look through the paper films at times. After studying about fifty cases, I learned that these paper films must be looked at, not through. I was converted then to the use of paper films for survey purposes. I think they would also serve perfectly well for institutions specializing in tuberculosis where so much of the work is not early case finding, but for the guidance of the surgical procedure, such as in collapse therapy and so forth. The use of paper films means economy.

The Minnesota Public Health Association in its report on twenty years of observation of studying tuberculosis stated that after adequate trial x-ray films on paper base were found as satisfactory as films on celluloid base; and paper x-ray films of standard size were subsequently employed.

In my opinion the following would be a fair evaluation of the different types of x-ray films of the chest:

- (1) Stereoscopic 14 by 17 inch films.
- (2) Single 14 by 17 inch film.
- (3) Four by five inch stereoscopic photoroentgenographic films.
- (4) Paper films.
- (5) Stereoscopic 35 mm. films.
- (6) Single 4 by 5 inch photoroentgenographic films.
- (7) Single 35 mm. photoroentgenographic films.
- (8) Fluoroscopy.

Question: Please discuss the present day indications for lobectomy and pneumonectomy in the treatment of pulmonary tuberculosis.

Answer (Dr. Graham): This is a very important question at the present time. I see that Dr. Overholt is sitting right in front of the Speaker's Table. I believe his experience in this field has been greater than that of anybody else. I should prefer, therefore, Mr. Chairman, to have you call upon him to answer this question.

Answer (Dr. Overholt): Renewed interest in the resection of lungs destroyed by tuberculosis has followed as a natural sequence to the success in the treatment of suppurative disease and pulmonary malignancy by extirpation. Indications seem clear-cut in the following types of disease:

- 1) When pulmonary tuberculosis is associated with another disease such as bronchiectasis or cancer.
 - 2) When what has seemed to be an adequate thoracoplasty has failed.
 - 3) For tuberculoma.
- Resection has also been advocated and carried out in certain other types of tuberculosis, resection being used as an alternative to thoracoplasty, in,
- 4) An extensive multilobar and predominantly unilateral tuberculosis with endobronchial disease.
 - 5) Extensive unilobar disease or giant cavitation when thoracoplasty failure is anticipated.
 - 6) In progressive unilobar disease with symptoms suggesting bronchial disease and pneumothorax failing.

Question: Evaluate the different Tuberculin Tests—Old Tuberculin, PPD, Patch. Which is the most accurate and standardized for school and other large surveys?

Answer (Dr. Hinshaw): I think it is rather generally agreed that the intracutaneous method of introducing tuberculin is superior to the patch method of applying tuberculin. It is obviously more certain that the material is coming in contact with the sensitized tissue. Most studies utilizing the patch test do show a high degree of accuracy but they are not yet perfect. Most physicians believe that intracutaneous injection of tuberculin is easy to do and that it is the preferred method.

Question: High School students are tested with tuberculin. One group is negative, another group is positive. Both groups are x-rayed. Films of the negative group show as many abnormal signs as those of the positive group. What does this mean?

Answer (Col. Long): If the lesions are calcified and the tuberculin test is negative, it means one of two things. Either the lesion in question is not tuberculous, or it is an old tuberculous infection so well healed that the body is no longer sensitized. We now know that other infections than tuberculosis cause pulmonary and lymph node lesions that calcify. It has been shown, also, that persons who develop tuberculous lesions that calcify are positive to tuberculin for a period, but may lose their sensitiveness if their lesions heal and they remain for some years out of contact with tuberculosis.

Question: What is the cause and significance of "egg-shell" calcifications in cases of silicosis? Do they or do they not represent the results of tuberculous infection?

Answer (Dr. Case): For this answer, I must depend on the teachings of Dr. H. C. Sweany, of Chicago. It seems well established that the so-called "egg-shell" deposits seen in the lung roots in cases of silicosis are pathognomonic of silicotuberculosis. The term "egg-shell" is employed because of the peculiar conformation of the calcific deposits.

Question: Is or is not an adenoma of the bronchus a malignant or potentially malignant tumor?

Answer (Dr. Graham): There is no doubt in my mind that an adenoma of the bronchus is a potentially malignant tumor. In 1937 Womack and I published our first paper on this subject recording six cases in which it was possible to demonstrate an invasion of the neighboring tissues and an involvement of the regional lymph glands. These are, of course, two of the important criteria of malignancy. Since that time several cases have been reported in the literature and we have had some ourselves in which metastases of distant organs have been found, notably the liver and various bones. Bloch and Adams of Chicago have reported some of these cases. It is true that often a patient will have an adenoma of the bronchus for many years without the development of malignancy. No one knows at present what factor sets off these tumors to make them suddenly take on a malignant phase but the evidence that some of them do so seems to me now to be incontrovertible. In my own opinion many of the cases of so-called round cell carcinoma and oat cell carcinoma have had their origin in a bronchial adenoma but I cannot take time to present the evidence for that opinion here.

I think it would be interesting to hear the comments of Col. Long on this subject. I hope you will call on him Mr. Chairman.

Answer (Col. Long): I would say it is a potentially malignant tumor. I believe the evidence is good that a carcinoma may develop from a tumor of this character.

Answer (Dr. Jackson): I do not believe that adenoma of the bronchus is a malignant tumor *nor do I believe that it has any inherent tendency* to become malignant. However, I would not go so far as to say that these tumors could *never* become malignant. In my opinion the impression that bronchial adenoma is typically malignant, or tends to become so, is due to confusion and error in histopathologic diagnosis; and I believe that the most important indication, in connection with the management of these cases, is better understanding and definition of its histopathology.

Question: What is your opinion as to the proper management of the pregnant tuberculous woman? Should her pregnancy be terminated prematurely? If allowed to continue, how should she be delivered? Please discuss according to stage of disease, age and parity of patient, etc.

Answer (Dr. Hinshaw): This question was answered for us this morning by a previous speaker whom all heard, I believe. There are great differences of opinion about management of the pregnant woman who has tuberculosis. Many women who have tuberculosis in latent form can go through pregnancy fairly safely and can successfully raise a family. The question of the stage of the disease and the roentgenographic appearance of the lesion deserve emphasis. After delivery the patient is in greater danger than during pregnancy. This danger may be due in part to the fact that she is disturbed frequently at night by a crying baby and there is constant domestic turmoil, but with assistance in the home the mother usually can be protected. Medical observation of a woman who has tuberculous disease is even more important following delivery than it is during the course of pregnancy.

Question: What is the pathological and clinical significance of pulmonary shadows and ring shadows following a primary inapparent coccidioidomycosis infection?

Answer (Col. Long): As you all know, coccidioidomycosis infection has become common since we have had a large turnover of troops in regions where the disease is prevalent. There have been numerous cases in California, Arizona, New Mexico and Texas.

The ring-like shadows represent thin-walled cavities. They may persist a long time and ultimately close with a small scar, without development of the granulomatous phase of the disease. In the army the cavities are considered to be a source of danger in that they may become secondarily infected. Men with such lesions are not accepted for military service. If men in the service develop cavities, however, they are not necessarily discharged, because healing not infrequently occurs promptly.

Question: How is the absence of clotting of blood in closed pleural cavity explained?

Answer (Dr. Graham): I don't think we have any very satisfactory answer to this question at the present time. A good deal of work has been done on it but I know of no satisfactory answer.

Question: Please discuss essential points in technique and value of use of diodrast in outlining the pulmonary circulation.

Answer (Dr. Case): A special concentrated solution of DIODRAST (70% aqueous solution) containing nearly 50 per cent of iodine is furnished on special requisition for this purpose. Because it may have a toxic effect, it should be employed by the intravenous method only in cases presenting special or difficult diagnostic problems where the differential diagnosis of vascular or extravascular tumor or of vascular anomaly cannot be made by any other method. It was developed primarily for cardiac and pulmonary visualization.

The medicament must be injected rapidly and in sufficient quantity so that the cardiac chambers and the intrathoracic blood vessels may become opaque to the roentgen rays during the first circulation, and one must have equipment which will permit the roentgenography to be done instantly at the time of this first circulation.

This means that one must have equipment which permits the making of four or five films of the chest in quick succession. I have not had such ideal equipment but I have used my stereoscopic film changer, rapidly unloading and reloading the film changer as the exposures were made. By having one's team of assistants rehearse in advance, six films can be made quickly but they are not spaced evenly. I remember thirty-five years ago Dr. Percy Brown had a great wheel with six compartments in it, each accommodating a film. The patient stood in front of the wheel and as the exposures were made the wheel rotated, bringing the films successively into position for exposure. This was employed for gastrointestinal work, but an apparatus of this type would be equally successful for cardioangiography.

To visualize the pulmonary vessels it is advisable to determine the ether arm-to-lung circulation time for the right chambers of the heart and the pulmonary arterial tree. The approximate time of opacification of the pulmonary arterial tree is obtained by subtracting one second from the ether circulation time. Generally the right ventricle and the pulmonary arterial tree are opacified 2.5 seconds after the start of the injection. The pulmonary veins in the left auricle show in six seconds. In pathological conditions the time of exposure may vary considerably from the values just named, and a series of films gives one a much better chance to record the pulmonary vessels than a single film made at a calculated time.

The roentgenographic technic is a little different from that required for ordinary lung films. There must be greater penetration, comparable to that employed in doing bronchography.

The posteroanterior position is ordinarily employed for the pulmonary-vascular network and lung roots, but the left lateral projection also shows the main stem of the pulmonary artery very well.

There are some contraindications to the use of DIODRAST in the concentrated solution, including hyperthyroidism, nephritis, severe disorders of the liver. It apparently has no ill effect when given to patients suffering from active tuberculosis. Patients who are in collapse or who are critically ill should not be examined.

Question: What electrocardiographic variations, if any, are produced by artificial pneumothorax, phrenic exairesis, and thoracoplasty?

Answer (Dr. Katz): I am glad that this question was raised because it gives me the opportunity of pointing out that alterations in the

electrocardiogram are produced not only by changes in the location of impulse origin, in the manner of impulse spread and by the development of currents of injury, but also by changes in the position of the heart. Alterations in the electrocardiogram are produced by these chest operations by virtue of their effect in shifting the heart's position. Artificial pneumothorax, in addition, brings air, a very poor electrical conductor, close to the heart, thereby modifying the electrical field the heart creates in the body. The variety of changes in the electrocardiogram are manifold, and no useful purpose is served by attempting to catalogue them. It is far more important to realize that when an abnormal electrocardiogram is encountered following these procedures it is to be considered the result of a shifted position of the heart and not ascribed, without further evidence, to disease of the heart. This point cannot be stressed sufficiently.

Among the changes encountered are inversions of the QRS complex, flattening or inversion of the T wave and deviations of the S-T segment. The deviations of the axis in the electrocardiogram may not coincide with the deviation of the anatomic axis of the heart. Often the two go in opposite directions because the heart not only shifts on its transverse and anteroposterior axis but rotates on its long axis as well.

When the heart becomes more pendulous, abnormalities of the P wave may appear, which, when associated with low voltage and/or right axis deviation, may suggest the pattern seen in chronic cor pulmonale. In cases seen by chest physicians it may be difficult to distinguish between a right heart strain and a positional change in the electrocardiogram. The chest physician must be careful in his diagnosis of disease of the heart from an abnormal electrocardiographic contour until he has assured himself that the changes are not due to displacement of the heart.

College News

EXECUTIVE COUNCIL AND BOARD OF REGENTS MEETINGS

The members of the Executive Council and Board of Regents of the American College of Chest Physicians held their annual meeting at the Palmer House, Chicago, Illinois, June 16-17, 1945. The meeting was attended by the following Regents and chairmen of College councils and committees:

- Dr. Andrew L. Banyai, Wauwatosa, Wisconsin
- Dr. Benjamin L. Brock, Waverly Hills, Kentucky
- Captain Robert E. Duncan, USN, Washington, D. C.
- Dr. Edward W. Hayes, Monrovia, California
- Dr. Charles M. Hendricks, El Paso, Texas
- Dr. Paul H. Holinger, Chicago, Illinois
- Dr. William A. Hudson, Detroit, Michigan
- Dr. Minas Joannides, Chicago, Illinois
- Dr. Edwin R. Levine, Chicago, Illinois
- Dr. C. Howard Marcy, Pittsburgh, Pennsylvania
- Dr. Louis Mark, Columbus, Ohio
- Dr. Jay Arthur Myers, Minneapolis, Minnesota
- Dr. William E. Ogden, Toronto, Ontario, Canada
- Dr. Richard H. Overholt, Brookline, Massachusetts

Dr. J. Winthrop Peabody, Washington, D. C.
Dr. Joseph C. Placak, Cleveland, Ohio
Dr. Nelson W. Strohm, Buffalo, New York
Dr. James H. Stygall, Indianapolis, Indiana
Dr. Paul A. Turner, Louisville, Kentucky

The committee reports and business transacted at the meeting will be published in the next issue of the journal.

Illinois Chapter Host to Board of Regents

The Illinois Chapter of the College gave a dinner at The Stevens Hotel, Chicago, Sunday, June 17, for the visiting members of the Board of Regents and the Chairmen of the College councils and committees. The dinner was attended by approximately fifty members of the College.

Dr. Fred M. F. Meixner, Peoria, President of the Illinois Chapter, presided at the dinner meeting and he introduced the officials of the College and the invited guests. All of the members of the Illinois Chapter who attended the dinner were also introduced by Dr. Meixner. The following past presidents of the Illinois Chapter attended the dinner meeting: Dr. Robert K. Campbell, Springfield; Dr. Otto C. Schlack, Oak Forest; and Dr. Minas Joannides, Chicago. Guests from other countries were Dr. William C. Ogden, Toronto, Regent of the College for Canada; Dr. K. C. Johnston, Winnipeg, Canada; and Dr. Adrian Pierry, Valparaiso, Chile.

TUBERCULOSIS CONTROL IN RUSSIA

The Information Bulletin of the Embassy of the Union of Soviet Socialist Republics reports that in the Ukraine, there are 196 dispensaries and wards with 3,790 beds and sanatoria with about 4,000 beds for the treatment of tuberculosis. Special country schools for children suffering from tuberculosis and homes for the adult tuberculous have been opened. Institutes engaged in the study of tuberculosis have been restored at Kiev, Kharkov, and Odessa. In addition to scientific research in clinical treatment, these institutions are helping to improve and expand the network of the institutions combatting tuberculosis in Russia.

College News Notes

Dr. Octavio Rivero Partagas, F.C.C.P., Havana, President of the Cuban Chapter of the College, has been appointed Minister of Public Health in the Cabinet of President Grau of Cuba.

Dr. Antonio Navarrete, F.C.C.P., Havana, Cuba, has been appointed to the Consejo Superior de Tuberculosis of Cuba.

Captain Robert E. Duncan, (MC) USN, F.C.C.P., Washington, D. C., Chairman of the Membership Committee of the College, has been appointed Commanding Officer of the U. S. Naval Hospital at Bethesda, Maryland.

Dr. Sidney A. Slater, F.C.C.P., Worthington, Minnesota, was honored by his alma mater, the Medical College of Virginia, at a special convocation on April 27th, when he received the degree of Doctor of Science.

Colonel A. A. Leonidoff, M.C., F.C.C.P., Poughkeepsie, New York, who is stationed in China, was appointed Professor of Practical Training in the Second Branch of the Medical College by Generalissimo Chiang Kai-Shek.

Lt. Col. Burgess L. Gordon, M.C., F.C.C.P., Philadelphia, has been appointed Chief of the Medical Service at the New U. S. Army General Hospital at Camp Pickett, Virginia. Colonel Gordon was formerly assistant to the chief of the Administration Branch, Hospital Division, Office of the Surgeon General.

Major Frank Philip Coleman, M.C., Columbia, South Carolina, has been promoted to Lieutenant Colonel.

Dr. John C. Parsons, F.C.C.P., Des Moines, Iowa, has been elected Secretary of the Iowa State Medical Society.

Dr. Willard Van Hazel, F.C.C.P., Chicago, Illinois, presented a paper entitled, "Tumors of the Chest" at the U. S. Naval Hospital, Great Lakes, Illinois, on May 15th.

Dr. Frederick Slyfield, F.C.C.P., Seattle, Washington, was chairman of the Wartime Graduate Medical Meeting held at the Baxter General Hospital, Spokane, Washington, on May 18th.

**FALL REFRESHER COURSE IN
LARYNGOLOGY, RHINOLOGY AND OTOTOLOGY
AT THE UNIVERSITY OF ILLINOIS COLLEGE OF MEDICINE**

The University of Illinois College of Medicine announces its sixth semi-annual Refresher Course in Laryngology, Rhinology and Otology, September 24th through September 29th, 1945, at the College, in Chicago. The course is intensive and largely didactic, but some clinical instruction is also provided.

It is especially suited to specialists unable to devote a longer period for advanced instruction and to others seeking a comprehensive review of the field of otorhinolaryngology. The number of registrants will be limited. It is therefore desirable to apply for registration immediately. The fee is \$50. When applying, give full details as to school and year of graduation, postgraduate training, college degrees, etc. Write to Dr. A. R. Hollender, Chairman, Refresher Course Committee, Department of Otolaryngology, University of Illinois College of Medicine, 1853 West Polk Street, Chicago 12, Illinois.

"COURAGE AND DEVOTION BEYOND THE CALL OF DUTY"

Through the cooperation of Mead Johnson & Company, \$34,000 in War Bonds are being offered to physician-artists (both in civilian and in military service) for art works best illustrating the above title.

This contest is open to members of the American Physicians Art Association. For full details, write Dr. F. H. Redewill, Secretary, Flood Building, San Francisco, Cal., or Mead Johnson & Co., Evansville 21, Indiana.

—Reader Notice.